Frontier Culture Museum of Virginia
Crossing Gallery

PRE-PLANNING REPORT

August 2018
Staunton, Virginia

QUINN EVANS ARCHITECTS

FRONTIER CULTURE MUSEUM

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INTRODUCTION

Quinn Evans Architects (QEA) and the architecture/ engineering (A/E) project team are collaborating with the Frontier Culture Museum of Virginia (FCMV) to develop a planning approach for a proposed Crossing Gallery buildling. The purpose of this submission is to present the work completed to date and confirm FCMV approval of the approach developed. The Crossing Gallery building will provide a new entry, visitor amenities, and three new exhibit galleries including the Crossing Gallery exhibit.

In an extraordinary and impactful way, FCMV enriches and educates Virginians and regional visitors about the resilience, resourcefulness, adaptation, and perseverance their forebears demonstrated in the face of unfamiliar and challenging environments. With the support of costumed interpreters, FCMV supports the museum's vision:

"We bring history to life!"

The "Old World" (European and African homesteads) and "New World" (American settlements) exhibits provide a rich context for the museum visitors to understand the interpretive messaging. However the story of the transatlantic crossing is a missing piece to the overall message, and the establishment of a Crossing Gallery exhibit will help to clarify the complete story on the development of the American frontier culture.

The A/E team kicked off the pre-design process on May 1, 2018. The result of this process is a clear path forward that captures the organization's ethos and purpose in a holistic and tangible form in the Crossing Gallery project, which will achieve the following:

- Guide all aspects of the plan in support of FCMV's mission and aspirations
- Understand present and projected audiences, visitor experiences, and themes
- Develop the site, building, and interpretive concepts in harmony with each other and accordance with the mission and audience
- Address long-term sustainable operations, value, and implementation considerations that can make or break future viability

PROJECT PARTICIPANTS

FCMV TEAM

Eric Bryan	Interim Director
Peggy Sheets	Vice Chair, Board of Trustees, Building and Grounds Committee
William Sibert	Board of Trustees, Building and Committee
Justin Reiter	American Frontier Culture Foundation, Executive Director
David Holsinger	Building and Grounds Committee, Foundation Board of Directors
Ron Capps	Former Foundation Board of Directors
Merritt Schoonover	Director of Administration
Joseph Herget	Director of Marketing
Andrew Richardson	Director of Education
Erin O'Connell	Private Event Specialist
David Puckett	Director of Collections
Cliff Edwards	Building & Grounds Superintendent

A/E TEAM

Alyson Steele	QEA, Principal
Katie Slattery	QEA, Project Manager
Ryan McEnroe	QEA, Project Architect
Aurora Smith	QEA, Designer
Bill Lazenby	The PRD Group, Director of Research
Dan Carmine	Mueller and Associates, Mechanical Engineer
Ron Maylor	Mueller and Associates, Electrical Engineer
John Matteo	1200 AE, Principal, Structural Engineer
Robert Brown	R.W. Brown & Assoc., Cost Estimator

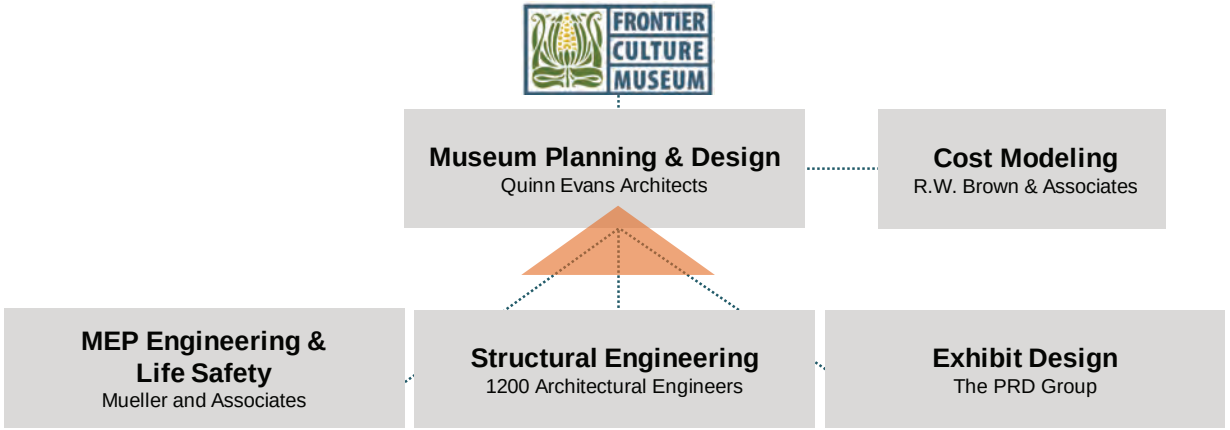


Figure 1.1
PROJECT TEAM ORGANIZATIONAL STRUCTURE

APPROACH

QEA received contract approval and Notice to Proceed in late April 2018. The Pre-Planning effort occurred over a four-month period and was broken down into four phases. Each phase included an onsite workshop with FCMV staff and administrators, FCMV Board of Trustees members, and American Frontier Culture Foundation leaders, as well as A/E team leaders. This was a collaborative approach that required regular and repeat engagement by all stakeholders. This report is a result of the dedicated work by all participants.

VISIONING (APRIL - MAY)
Goal: *Establish goals and vision statement through stakeholder involvement. Gather existing site and facility base files and confirm existing facility assessment.*

This initial phase provided the A/E team the opportunity to get to know FCMV. A kick-off meeting and site visit provided introductory information from each stakeholder on their individual understanding of the project, goals and requirements for the facility and the exhibit, as well as their role and responsibilities at the museum. During this period the A/E team collected site information, completed a survey of existing visitor services buildings, and reviewed existing document resources. Together the group explored critical site issues, exhibit goals and objectives, and potential program elements.

The highlight of this stage was the Crossing Gallery project Visioning Workshop (refer to Figure 1.2). Beginning with FCMV's mission, the project goals and objectives, from the perspective context of site, building, and interpretation, were developed. The goals and objectives addressed the audience, experience, character, performance, value, operational sustainability, and other key considerations. The developed project goals establish an understanding of how the future site and buildings can better support the Museum's mission and guide the design and decision-making process.

CONSTRAINTS AND OPPORTUNITIES (MAY - JUNE)
Goal: *Identify the constraints and opportunities based upon site and building analysis.*

After the A/E team immersed themselves in the existing facilities, the team began to understand what the proposed Crossing Gallery building could bring to the site-based visitor experience. The facility location was identified as a key to the success of the project and the four existing facilities were assessed to understand their qualitative and quantitative attributes. These findings were considered in the context of projections for group and walk-in visitation throughout the seasons, interpretive and educational objectives and programs, and establishing efficient and sustainable operations. Using this data, the A/E team made recommendations on whether the existing visitor service facilities were appropriate for the proposed Crossing Gallery building, other uses, or if the existing facilities should be replaced. Program requirements were outlined and visitorship data was closely analyzed to better inform the planning effort.

The design team led the stakeholder group through multiple approaches for organizing the site and facility in response to the Museum's needs over time. Indoor and outdoor program quantities and functions for the proposed Crossing Gallery buildling were identified in addition to space planning scenarios, how different groups would use the space based upon need, and how staff would utilize flexible organizational strategies to best accommodate their requirements. How interpretive themes are introduced, recalled, and organized

Figure 1.2
VISIONING WORKSHOP

Figure 1.3
SCHOOL GROUP VISITING FCMV

in conjunction with the Crossing Gallery buildling and other visitor areas were collaboratively addressed in an interactive hands-on activity.

Together, the group envisioned a typical first-time visit, a school group visit, and public events, touching on issues of arrival, orientation and wayfinding, transitions, and departure (refer to Figure 1.3). The group discussed the character of the buildling and site and how to combine them to create a sense of welcome, curiosity, shelter, surprise, community, pride, awe, and inspiration.

Themes were identified at this workshop that repeat throughout all aspects of the project: adaptability, project viability, operational sustainability, and the building as a lens to the site. These themes and the developed project goals will be evident in all aspects of the project. The FCMV site and costumed interpreters are an important part of the interpretive message. Thus, the design intent for the proposed Crossing Gallery building is to serve as a support space for the larger landscape and not become the primary focus of the museum.

At the conclusion of this stage initial rough order of magnitude costs were shared to provide context for the effort required to develop a once-in-a-lifetime project.

Two architectural team members spent a day on site working side-by-side with the costumed interpreters and interacting with visitors to gain a better understanding of this critical aspect of the museum experience (refer to Figure 1.4).

ALTERNATIVE CONCEPTS (JUNE - JULY)
Goal: *Provide design options for the client to visualize and provide direction.*

Based on the program and visitor experience goals developed on the outcomes of previous stages, the A/E team presented two concepts for the building and interpretive experience. These concepts responded to the stated goals, site issues, and desired program elements. Each concept included a building layout and adjacency diagrams, character images, programs, and integration with the site. The two options were viable, distinct alternatives for the stakeholders to assess and review. At the workshop, participants further discussed project priorities, site planning issues, and their impact on the building form.

Benefits and trade-offs of the alternatives, with respect to project goals, objectives, value, and priorities were collaboratively assessed; along with phasing and other program execution options. FCMV requested changes that synthesized the two original options into a third option (refer to Figure 1.5). This new solution was uniformly approved as responding to the project and program goals.

FCMV also began interviewing all staff members for opinions on the purpose, importance, siting, and use of a Crossing Gallery building. As of today, 100% of the staff have been interviewed.

PREFERRED CONCEPT (JULY- AUGUST)
Goal: *Synthesize design direction into a single scheme for all stakeholders to support.*

A final report documenting work completed, process, approach and critical decisions made was developed including architectural, interpretive, and engineering narratives. As well as a refined visitor experience narrative. Updated cost information was provided for reference in requesting funding for the project.

This report compiles the major points of the discussion and intended direction for the Crossing Gallery at the Frontier Culture Museum of Virginia.

Figure 1.4
ARCHITECTURAL TEAM MEMBERS ON SITE AT FCMV

Figure 1.5
OPTION 3 CHARRETTE TO DEVELOP A HYBRID OPTION C
A third concept design option was developed as a hybrid approach between the two previous design alternative concepts.

SCHEDULE

	Mid APRIL – Early MAY	Mid May- Early June	JUNE	JULY	
	V Visioning	**CO** Constraints Opportunities	**AC** Alternative Concepts	**PC** Preferred Concept	
Quinn Evans Team	Goals Vision Statement	Program Document Existing Site & Building Analysis	Visitor Experience Narrative Layout(s) Opportunities & Challenges	Pre-Planning Report	
Frontier Culture Museum	Participate Document Exchange Stakeholder List	Participate Review, Confirm & Comment on **Program**	Participate Review, Confirm & Comment on **Concepts**	Refine Coordinate with Board	
cost	N/A	ROM	Value Trade Offs	Refined Concept Cost	
meetings	★ 5/1 - 2	★ 5/21 - 22	★ 6/13 - 14	★ 7/16	★ 8/7

QUINN EVANS ARCHITECTS

FRONTIER CULTURE MUSEUM

2

PROJECT GOALS

The project goals were developed collaboratively by the design team working closely with the Frontier Culture Museum of Virginia (FCMV) to determine the overarching objectives for the project. At the project kick-toff meeting the entire project team completed group visioning activities, a site walk to review the existing building conditions, and shared in an open dialogue to distill the strengths of the FCMV. The visioning excercises started with an examination of the museum mission which states:

> *The Frontier Culture Museum of Virginia tells the story of the thousands of people who migrated to colonial America, and of the life they created here for themselves and their descendants.*
>
> *In conjunction with the celebration of American independence, in 1975 a group of ambitious individuals proposed the creation of an expansive outdoor museum that would interpret the contributions made by settlers from backcountry communities of England, Germany, Ireland, and West Africa that pioneered our Western frontier in the 1700s.*

This approach ensured that each of the existing strengths of the museum is not only maintained, but also further enhanced by the proposed design of the Crossing Gallery building. Additionally, the team identified current deficiencies throughout the site that could be addressed by the proposed project in order to improve the overall visitor experience and museum operation.

These goals were further refined by the design team through subsequent meetings with stakeholders and analysis of the museum's existing facilities, current visitorship, and plans for future growth.

The project goals have been referred to continually throughout the design process to serve as guiding principles (the "North Star"), for the development of the design so that the project will help the museum reach its full potential and bring visitors more fully into the full experience of the frontier.

In addition to the required site work three significant changes to site are required to make this plan a success - demolition of the Dairy Barns, removal of the existing Cochran Pavilion and removal of the central parking for staff.

CROSSING GALLERY PROJECT GOALS

VISITOR EXPERIENCE

Provide a place for indoor/outdoor interpretive engagement and a decompression area between old and new world experiences for interaction, comfort services, and reflection.

INTERPRETIVE EXPERIENCE

Provide an overview of the complete interpretive experience from diverse perspectives and engage visitors through multi-sensory and costumed interpretation.

PROGRAMMING SUPPORT

Be flexible for various user needs – annually and over the long term.

SUSTAINABLE OPERATIONS

Have a positive impact on overall site operations and support improved operation of other facilities.

3

VISITORSHIP

The Frontier Culture Museum of Virginia (FCMV) has proven its resourcefulness and viability, showing robust increases in visitation and income since 2012, bucking the general downward trend of its peers. It has done so through creative use of programming in tandem with its unique outdoor living history exhibits, attuned to seasonal and holiday visitation patterns of its audiences. The ability to provide indoor visitor services and interpretive exhibits that complement, enhance, and make sense of the high-quality outdoor experiences will support the FCMV organization as it builds strength to attract growing audiences to a wider variety of programs throughout the year. The types and numbers of expected visitors to the museum drive interpretive and building programs which impacts planning for site interpretation, site use and management, and facilities scoping.

Since 2012 FCMV has collected Visitorship data and organized it into five categories (Refer to Figure 3.1 and Figure 3.2):

- Education Workshops
- Walk-In Groups
- General Groups
- School Admission
- General Admission (includes Special Events)

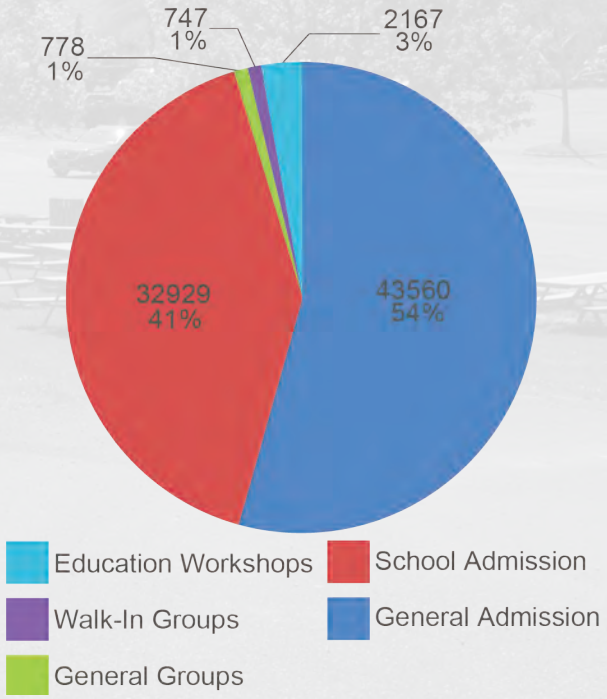


Figure 3.1
VISITORSHIP DISTRIBUTION, 2017

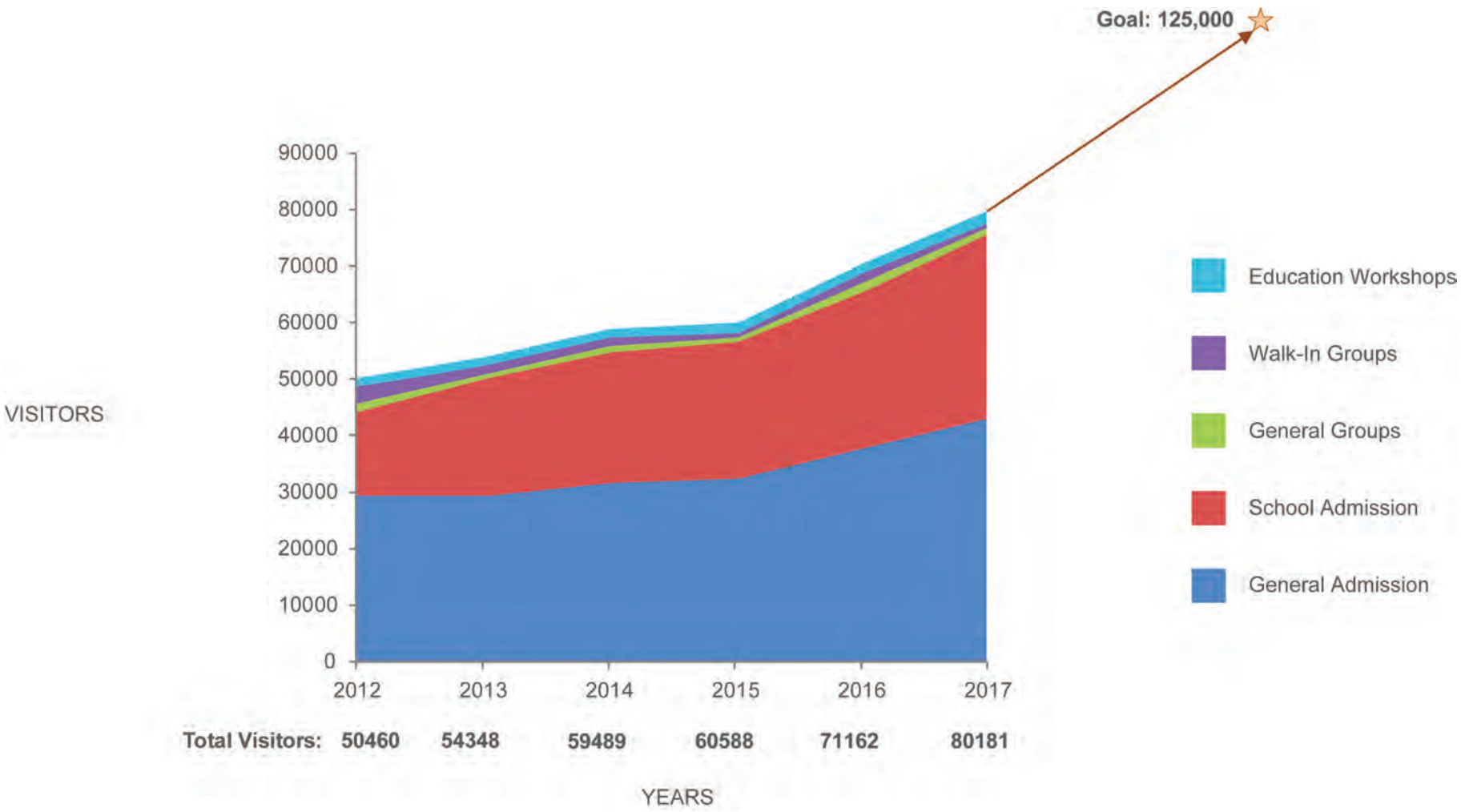


Figure 3.2
2012-2017 VISITORSHIP TRENDS

Analysis of the Visitorship data shows several trends:

- The highest months of Visitorship are in Spring (April/ May) and Fall (October). (Refer to Figure 3.3)
- The lowest months of Visitorship are in Winter (January/ February).
- Efforts to increase school group attendance were successful and are reflected starting in 2014. (Refer to Figure 3.2)

Visitor type projections are critical to developing program strategies and ensuring the infrastructure is adequately geared to target visitor types. The museum has an existing annual visitorship of ~80,000 and has an annual visitation target of 125,000. To achieve this, months with lower Visitorship will become a target period for growth (Refer to Figure 3.4). The 2017 peak month at FCMV was May at 13.4% of total visitorship.

DESIGN DAY

The A/E team proposed the following Design Months when trying to achieve the target of 125,000.

Summer Design Month is 12% of visitorship at 14,500 visitors.

- 3,274 visitors in an average week (22.58% of monthly visitorship).
- 655 visitors in an average summer weekend day (20% of weekly visitorship).

Winter Design Month is 5.6% of visitorship at 7,000

- 1,581 visitors in an average week (22.58% of monthly visitorship) .
- 315 visitors in an average winter weekend day (20% of weekly visitorship).

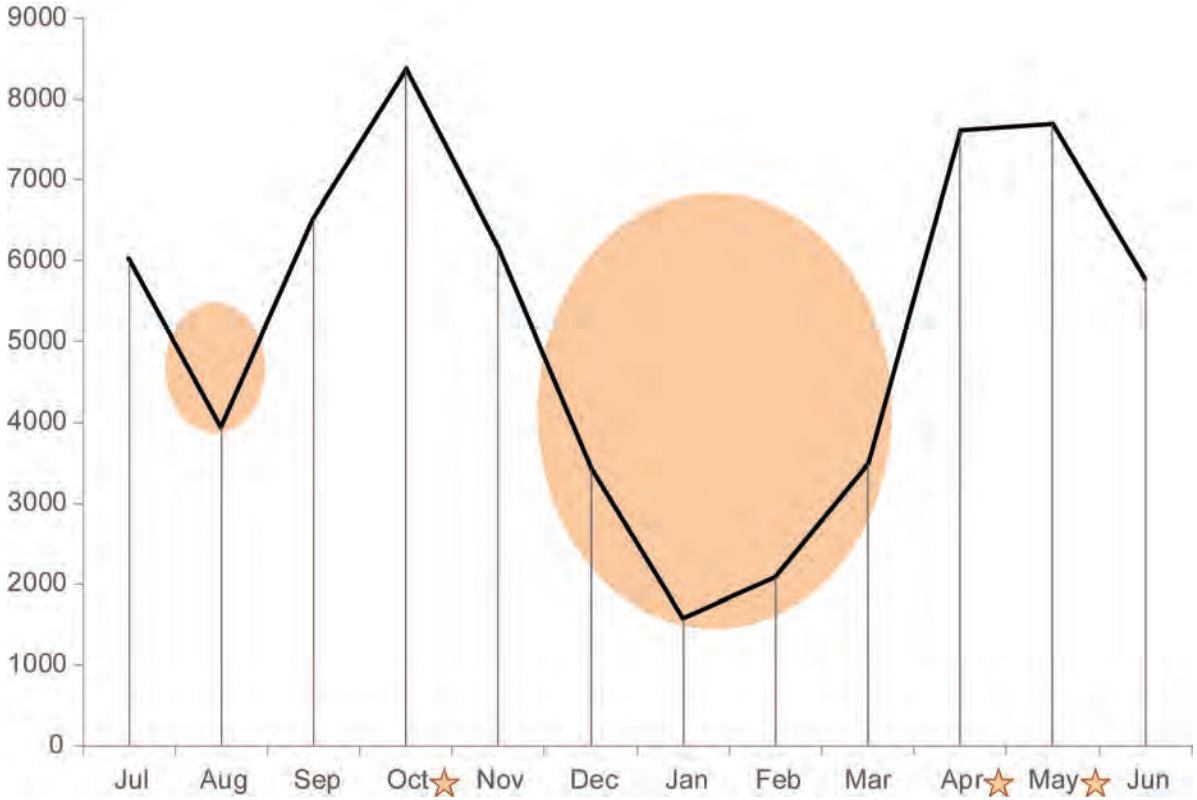
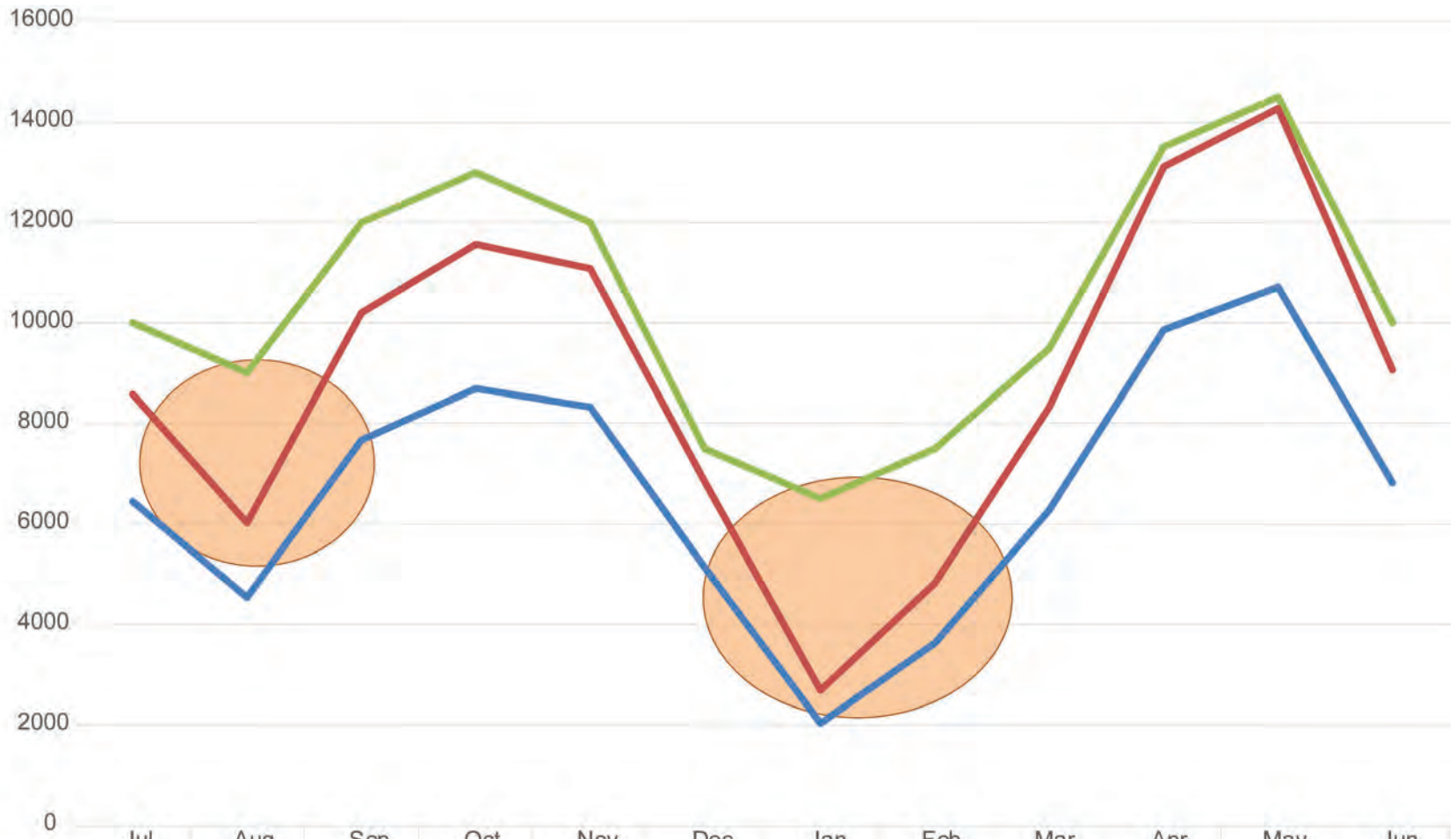


Figure 3.3
AVERAGE MONTHLY VISITATION 2012-2017
Average peak month over the past six years is October at 13.35%



	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Optimized Site Use	10000	9000	12000	13000	12000	7500	6500	7500	9500	13500	14500	10000
Increase by 33% /Mo.	8594	6030	10208	11564	11083	6850	2693	4824	8335	13111	14272	9076
2017 Total Visitors	6462	4534	7675	8695	8333	5150	2025	3627	6267	9858	10731	6824

Figure 3.4
APPROACHES TO HIT 125,000 VISITORS

The goal of establishing a design day is to establish a realistic target of what the visitorship totals will look like on a single busy day. It is not intended to be the busiest day of the year but should represent a high visitation day. The design day is then used to properly plan and size programmed spaces.

The design team offer the premise that in the summer visitors will primarily be out on the site, so the facility will be most taxed in the winter months. As such the winter design day data for the numbers of visitors in the building will inform the buildling design.

An average winter weekend day will have 315 visitors on site and that people stay for 90 minutes (1.5 hours).

The average arrivals per hour at peak times is 42 people. This means that peak visitorship would be 136 people on site at a single time midday.

This assumes that +/- 60% of the visitors arrive in the morning and +/- 40% will arrive in the afternoon. And the hours of operations in the winter is 10 am to 4 pm. Refer to Figure 3.5.

	Arrivals/Hour	Departure	Visitors on Site
10:00	42	0	42
10:30	52	0	94
11:00	42	0	136
11:30	42	42	136
12:00	42	52	126
12:30	21	42	105
1:00	21	42	84
1:30	21	42	63
2:00	21	21	63
2:30	11	21	53
3:00	0	21	32
3:30	0	21	11
Total:	315		

Figure 3.5
DESIGN DAY

OPPORTUNITIES FOR GROWTH

The stakeholder group has outlined a multi-pronged approach to incrementally increase visitorship throughout the year. The core focus of the learning environment for the living history museum has been and will remain the exhibits out on site. One of the most challenging issues the staff of FCMV have currently when securing larger groups (school groups or tour groups) is the reality that so much of the learning experience at the museum is on-site and in the elements. Additionally, smaller family groups who understand the experience is a living history museum will change their plans the day of due to weather implications. With the existence of the proposed Crossing Gallery buildling, the staff have identified a diversified approach to increasing visitors throughout the year while filling the gaps within the annual cycle.

The new facility will allow the staff to plan for programming 12 months out of the year, and if weather conditions happen to be accommodating, the interpretive staff can easily integrate on-site activities. Further diversification efforts will include accommodating the existing visitor groups independent of inclement weather throughout the year, supporting the repeat visitor that comes back multiple times a year, as well as identifying new types of visitors. New visitor types include large tour bus companies, additional school outreach programs for private school and pre-school, lifelong learning groups, and private events for business development and corporate retreats.

FRONTIER
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4

ANNUAL CYCLE

Like most organizations, there are a number of overlapping efforts that help to support the annual operations of the Frontier Culture Museum of Virginia (FCMV), (Refer to Figure 4.1). Due to the existing facilities, provided programing, and weather conditions, the various events and operation inputs vary throughout the year. During the winter months (middle of December through the middle of March) there is a current decline in the amount of programming and amount of events that take place on-site. With the use of the proposed Crossing Gallery, this current “off-season” will soon be seen as an opportunity for the Museum, allowing visitorship and exposure to the interpretive message to be expanded upon.

HOURS OF OPERATION.

The museum is open from 9am to 5pm between early March and December 1st. The museum is on a shortened time period during the winter months and open from 10am to 4pm from December 1st through the second Monday in March. The museum is open 362 days a year, closed on Easter, Thanksgiving, and Christmas Day.

EDUCATION

FCMV develops programs for a number of different educational outreach programs. One of the primary visitor groups is Virginia schools. These visitors attend during the school year where specific programming has been developed between FCMV and the school to meet critical learning objectives. During the winter months, due to the inclement weather on-site, the FCMV interpretive staff will pack up their collection items and visit the schools directly within their classrooms throughout the state of Virginia. Furthermore, FCMV hosts summer camps for school-aged children, and other area summer camps visit the site to further explore and develop a stronger understanding of frontier culture.

INTERPRETIVE STAFF

The costumed interpreters are a critical part to sharing the story of how frontier culture came to be within the United States of America. The costumed interpreters are on-site from the middle of March through December. During this time, you can find the staff tending to the gardens, caring for the animals, cooking, manufacturing products, and speaking directly with the visitors. During the winter months the costumed interpreters are on a reduced schedule at the museum and incorporate interpretive training opportunities. The full-time interpretive staff are joined by the John Lewis Society where teenage interpreters are added to the staff to help with additional interpretive support between April and December.

As a means for further understand the interpretive messaging and the daily challenges the staff encounter, two architectural

team members volunteered as costumed interpreters and performed daily chores while observing the stories shared by the FCMV staff. Refer to Figure 4.2.

PRIVATE EVENTS

Similar to the education cycle, there are a number of various public and private events that take place on the site throughout the warmer seasons of the year. Refer to Figure 4.3. Each weekend from April through November (excluding July due to warm weather) the Octagonal barn is booked with a wedding event. Additionally, the museum hosts festivals 1-2 times a month between March and December where 500 – 2,000 visitors will be on site during a given day. The festivals include summer holiday weekends, Oktoberfest, Christmas Fair, and the like. Furthermore, the September naturalization ceremony, outdoor movie series, winter lecture series, and various company picnics and corporate events for employee training will take place throughout the year.

MAINTENANCE

Throughout the year there are a series of daily maintenance efforts that take place on the site. Daily efforts include trash removal, grounds and facility maintenance, and animal care/ control efforts. During the winter months maintenance and interpreter staff are able to collaborate on deferred maintenance projects while many of the animals are consolidated to a couple barn locations and are off-exhibit.

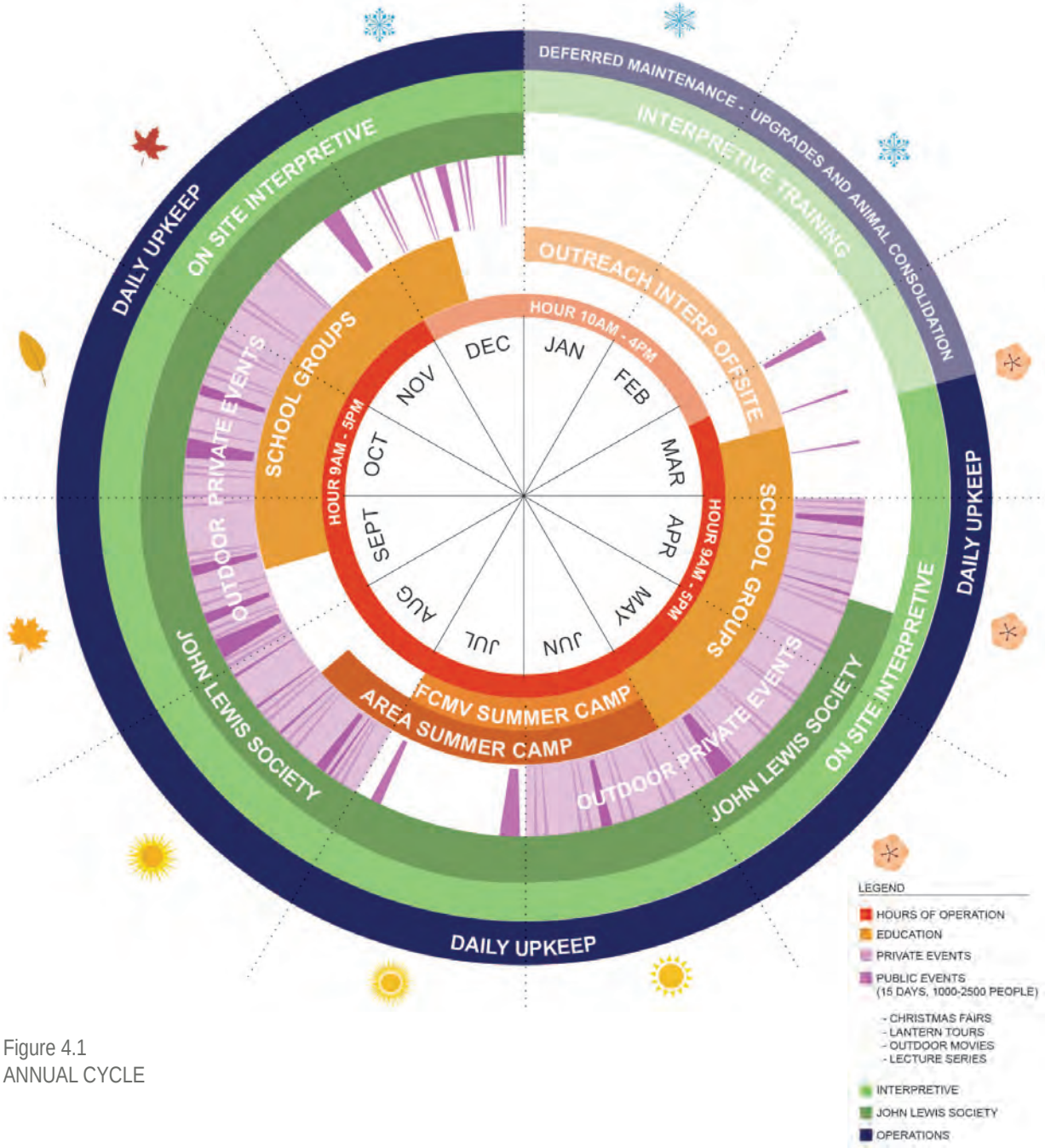


Figure 4.1
ANNUAL CYCLE

Figure 4.2
COSTUMED INTERPRETERS
Architectural team members volunteering as costume interpreters at 1600's English Farm and 1700's German Farm.

DATE		HOURS	EVENT	ATTEND
March	Fri	9-5	**Spring Homeschool Day**	850
March	Tues	7-9pm	**Spring Lecture Series**	75
March	Tues	7-9pm	**Spring Lecture Series**	75
April	Tues	7-9pm	**Spring Lecture Series**	75
April	Tues	7-9pm	**Spring Lecture Series**	75
April	Sat	9-5	**Easter Traditions**	1,200
April	Sun	9-5	**Easter Traditions**	500
May	Mon	9-5	**May Fair**	2,500
June	Sat	1-7 pm	**Wine & Jazz Festival**	1,000
July	Wed	9-5	**Independence Day**	2,000
July	Sat	9-5	**Igbo Cultural Activities**	1,000
Aug	Sat	9-5	**Lammas Harvest Fair**	1,200
Aug	Sun	4-7 pm	**Roots Music Concert**	250
Aug	Sun	4-7 pm	**Roots Music Concert**	250
Aug	Sun	4-7 pm	**Roots Music Concert**	250
Aug	Sun	4-7 pm	**Roots Music Concert**	250
Sept	Mon	7am-5pm	**Labor Day Fair / 5K Race**	2,000
Sept	Tues	11-3	**New Citizen Ceremony**	800
Sept	Fri	9-5	**Fall Homeschool Day**	850
Oct	Sat	12-7 pm	**Oktoberfest**	2,000
Oct	Sat	9-5	**Folklore, Games & Treats**	850
Nov	Friday	9-5	**Christmas Fair**	1,000
Nov	Sat	9-5	**Christmas Fair**	1,000
8-Dec	Sat	9-5	**Winter Homeschool Day**	500
Dec x7	Various	6-9	**Lantern Tours**	1,225

Figure 4.3
CALENDAR OF PLANNED EVENTS 2018

5

PROGRAM

The Crossing Gallery building program has been developed for Frontier Culture Museudm of Virginia's (FCMV) needs today, while allowing opportunities for adjustments and accounting for anticipated growth in the future. The primary program for the proposed facility is a new exhibit space showcasing the transatlantic migration – the Crossing Gallery. Additional support space and visitor services are also provided within the new facility as well as in adjacent buildings on site.

VISITOR SERVICES.
On site amenities help to keep visitors comfortable and encourage them to remain at the museum for longer durations of time. The proposed building program allows for a space that acts as a welcome area upon the entry to the site, and doubles as a decompression area between old and new world experiences. The space encourages interaction between visitors, provides comfort services, and allows users an opportunity to reflect upon their interpretation experience. Restrooms, refreshments, a museum shop, and ticketing are included. (~7,000 s.f.)

EXHIBIT/ INTERPRETATION.
The exhibit space includes the primary exhibit gallery, a temporary gallery, and a flexible education/interpretive area. Each of the exhibits allow for indoor/outdoor interpretive engagement. The primary exhibit – the Crossing Gallery - provides an overview of the complete interpretive experience from diverse perspectives, and engages visitors through multi-sensory and costumed interpretation. The exhibit shares the interpretive story of the transatlantic migration. The temporary exhibit space is flexible for different programmatic needs and designed to accommodate traveling exhibits of various sizes, while allowing for internal interpretation approaches and exhibits. Furthermore, the educational space provides an opportunity to augment existing educational spaces throughout the site. This space doubles as a private event area, adjacent to the exterior pavilion. (~14,000 s.f.)

ADMINISTRATION.
Staff support space necessary to support the entire interpretive messaging for the museum has been integrated into the design of the proposed facility. This program has been relocated from the existing dairy barn on-site and is key to the successful operations of the museum. Administrative support space includes shared office space, staff break room, costume shop, dressing rooms, and the library stacks required for research. (~4,000 s.f.)

SUPPORT.
Each of the aforementioned program spaces requires various levels of support to function efficiently. This portion of the program includes the required support and systems operations of the processed facility. Spaces include mechanical, electrical, telecommunications, trash, general storafve, and circulation space. (~5,000 s.f.)

EXTERIOR.
The connection back out to the site is the most important aspect to the visitor experience. Porches and a multi-purpose pavilion space help to provide visitor comfort, prospect, and refuge, while experiencing the views of the living history museum. The exterior program further supports visitor interaction and opportunities for reflection. The exterior pavilion area doubles as additional interpretation education space and as a private event area. (~10,000 s.f.)

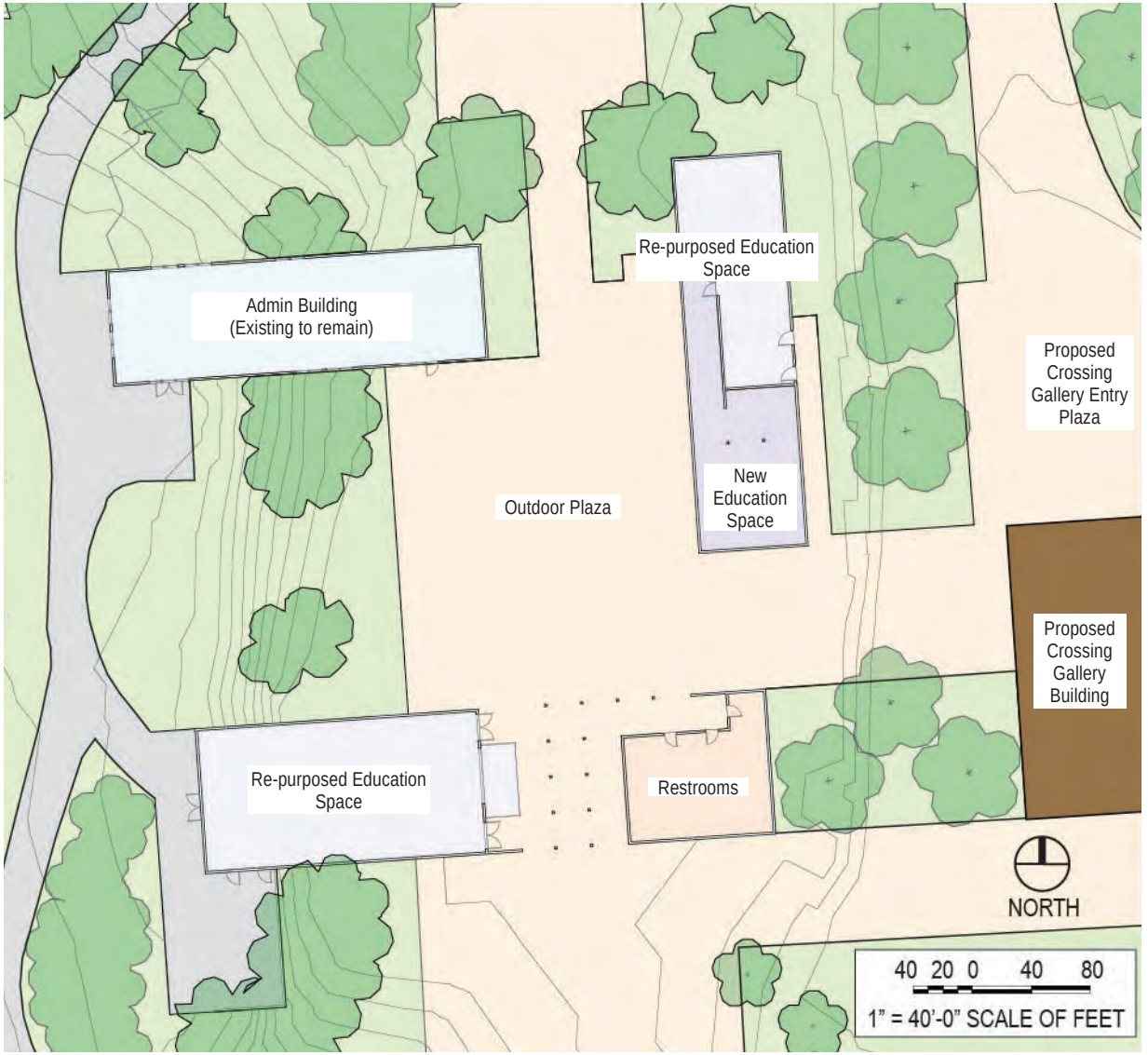


Figure 5.1
REIMAGINED VISITOR CENTER PLAZA

REPURPOSING EXISTING FACILITIES.
The existing museum shop, ticketing, and orientation theater are proposed to be renovated and repurposed as additional educational space. The existing plaza area and restrooms work well to accommodate and control large groups (Figure 1.3). These repurposed spaces can then further be utilized for a multitude of independent programing efforts including interpretive educational space during inclement weather, group break-outs, school lunches, and private events such as corporate team training. (~7,000 s.f.) Refer to Figure 5.1.

MAINTENANCE AND COLLECTION STORAGE.
As part of the proposed site design, the maintenance and collection storage functions will be relocated with new purpose-built facilities. The maintenance facility is primarily an unconditioned space that accommodates all the maintenance and operations responsibilities (including offices, lockers, and break room) for the site.

FCMV collection storage includes a permanaent and a reproduction collection. Many of the reproduction collection items are currently on exhibit throughout the site. Items are currently stored in multiple locations depending on quality, authenticity, material, size, and climate control requirements. The new space would be similar in size to existing collection storage. Collection storage is required for the museum accreditation and includes curatorial, collections, custodial, and unconditioned storage space. (Maintenance ~5,000 s.f. un-conditioned; Collection Storage 2,000 s.f. conditioned; 2,000 s.f. un-conditioned). Refer to Figure 5.2.

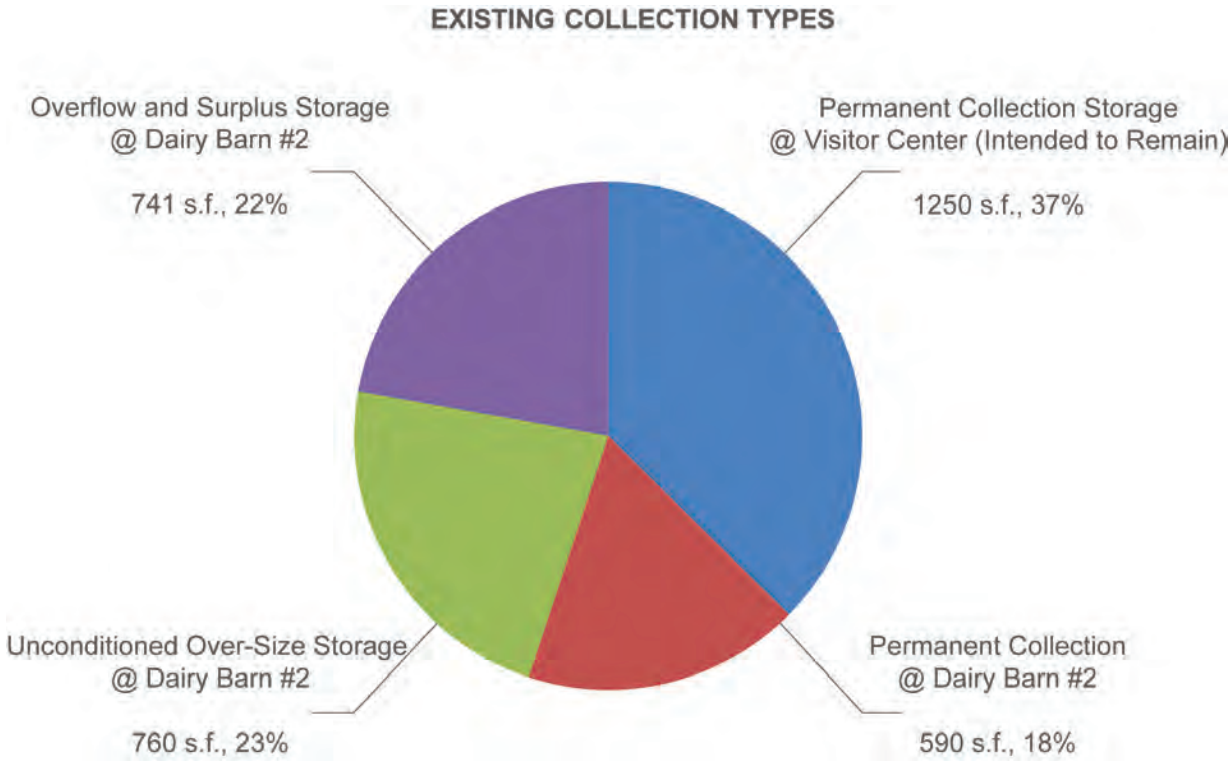


Figure 5.2
EXISTING COLLECTION TYPES

Crossing Gallery Program Requirements - Option C								
			No.		Area (sf)	Subtotal (sf)	Adjacency	Notes
Visitor Services								
1	**Arrival**					**1,600**		
	1.1.1	Lobby Vestibule	2	750	1500		1.1.2; 1.2.1, 1.2.2, 1.3.1, 2.1.2	Entry from arrivals and exit to exhibits. Welcome and Orientation space. An arrival place for visitors to decompress and find immediate services. Large groups are separated from general visitors and organize in the adjacent existing courtyard. Museum staff, graphic displays, and an interpreter performance area will provide guests with information about the museum and its offerings before purchasing a ticket. Although the Museum Shop and Food Services will be most strongly associated with the departure sequence, they will be visible and accessible from the entry.
	1.1.2	Welcome Desk	1	100	100		1.3.1,1.3.2; 1.1.1	A welcoming transaction and support space for staff to support transaction space stations, based upon the design day visitorship. Will be visible upon entering the building. Should accommodate storage of outfitting articles on days when visitorship is not pressing. Visitor queuing and orientation space for general visitors. 2 staff people to support; 1 staff person could also take sales from museum shop and refreshment on slow days.
1	**Public Restrooms**					**1,400**		
	1.2.1	Women's	3	250	750		1.1.1; 2.1.1, 2.1.3	Provide restroom facilities sized appropriately throughout the facility adjacent to public space; consider use by private events. Toilets are sized taking into account projected typical event size (300) as well as design day occupant load (315), and code.
	1.2.2	Men's	3	200	600		1.1.1; 2.1.1, 2.1.3	
	1.2.3	Water Fountain	1	50	50		1.2.1; 1.2.2	Provide bottle fill station.
	1.2.4	Family Restroom	1	75	75			To support family visitors and relieve general restroom congestion and privacy concerns.
1	**Sales**					**2,560**		
	1.3.1	Museum Shop	1	1440	1440		1.1.2; 1.3.2	Sale of seasonal clothing items and souvenirs. Light-filled, attractive, and visible from the entry and departure sequences, the sales areas should directly relate to visitors' interpretive experiences at the FCMV. Within the overall sales area, merchandise arrangements and display designs should address a spectrum of visitor types and price points. The shop requires vehicular access for loading heavy and/or bulky items.
	1.3.2	Refreshment/Food Service	1	500	500		1.3.1; 1.3.3	The refreshment services will offer visitors a comfortable chance to rest and interact within their groups in a relaxing atmosphere consistent with the character and quality of the site. The beverage and "grab & go" service as typically found in a quality coffee house as an operational model is currently being considered. Types of service and offerings should be carefully investigated by FCMV, working closely with a potential vendor for the site. It is assumed that school groups will eat outside or within educational space during inclement
	1.3.3	Food Service Storage	1	200	200		1.3.2; 1.3.4	Supplies and food storage. Likely to include some refrigeration and exhaust to manage related heat loads. Requires vehicular access from the exterior.
	1.3.4	Catering Kitchen	1	200	200		2.1.3	The catering kitchen allows outside vendors an opportunity to provide final preparation on food prior to service at a private event. Multiple outlets are provided for individual food heating systems. Countertops are durable and will be cleaned and sanitized on a regular basis. Work counter space, hand wash sink, ice maker, three-part sink, refrigerator, and storage for small caterer support articles. The kitchen requires vehicular access from the exterior.
	1.3.5	Office	1	220	220		1.1.1	Private space where issues with indisposed or unwell visitors can be addressed.
				Combined Total		**5,560**		

Exhibit/Interpretation								
2	**Exhibit**					**12,350**		
	2.1.1	Permanent Exhibit	1	8000	8000		1.2.1; 1.2.2	As the primary exhibit gallery in the Crossing Gallery, this area will be designed to assist with visitor flow, by careful arrangement of dense and reverential types of exhibit materials as well as interactives, and activity spaces. The interpretive experience will also be choreographed to prepare visitors for opportunities at the FCMV site, and facilitate reflection on those experiences upon return.
	2.1.2	Temporary Exhibit	1	3000	3000		1.1.1	Changing exhibits sized to accommodate traveling exhibits. Exhibits will be exchanged out on a regular basis. Opportunity for FCMV to add to interpretive message. Opportunity for private events.
	2.1.3	FCMV Education Space	1	1350	1350		1.2.1; 1.2.2; 2.2.1	Flexible space for inclement weather days where interpreters tell the whole interpretive message. Provide permanent exhibit for winter months sharing Old World and New World elements. Room needs to be very flexible for interpretive and rentable use. Acoustics are important. Needs to double for school lunches and interpretation on inclement weather days. Accommodate 2 school groups @ 675 s.f. Primary indoor/outdoor space. Education spaces are intended to support groups of up to 30 for hands-on activities. These areas will provide easy to clean surfaces, appropriate plumbing, day-lighting, and AV to support for success by multiple uses. Loose furniture will be able to be set up in multiple ways, for adaptability of the space.
2	**Learning Support**					**600**		
	2.2.1	Storage Closet	1	400	400		2.1.3	Tables and chairs for flexible space. Storage of linens and items not supplied by the caterers, as well as furniture tables/chairs for 120.
	2.2.2	Collection Storage Closet	1	200	200		2.2.2	Storage for interpretive collections development media materials.
				Combined Total		**12,950**		

Administration								
3	**Administration Support**					**190**		
	3.1.1	Janitor Closet	2	75	150		1.2.1; 1.2.2	Central storage location for supplies and equipment, in addition to typical floor janitor's closet.
	3.1.2	Unisex Restroom	1	40	40			Staff restroom.
3	**Staff Support (Relocated Existing Program)**					**2,735**		
	3.2.1	Shared Office	3	220	660			Single and shared office space for staff. Shared open workspace with individual task lighting and lockable storage at workstations.
	3.2.3	Staff Break Room	1	450	450			Break room for costumed interpreters and staff personnel. Supporting staff activities.
	3.2.4	Costume Shop	1	600	600			Fabrics and sewing room for costume fabrication and repair.
	3.2.5	Dressing Room - Women's	1	250	250			Dressing rooms with lockers, restroom, and shower facilities.
	3.2.6	Dressing Room - Men's	1	225	225			Dressing rooms with lockers, restroom, and shower facilities.
	3.2.7	Library Stacks	1	550	550			Required for museum accreditation status. Provide opportunities for staff to further research efforts.
				Combined Total		**2,925**		

Support								
4	**Facilities Support**					**1,500**		
	4.1.1	Recycling / Trash / Compost	1	100	100		1.3.2	For temporary storage of used materials and waste. Requires vehicular access from the exterior. Not for public use
	4.1.2	Mechanical / Electrical	2	650	1300			Plumbing room with pumps and geothermal, HVAC controls. Electrical room with PV connections.
	4.1.3	Head-in Room	1	100	100			Telecommunications
				Combined Total		**1,500**		
			Building Only					
			Visitor Center Total Net Area			**22,935**		
			Net to gross ratio			**1.35**		
			Visitor Center Gross Areas			**30,962**		

Site								
5	**Exterior**					**7,200**		
	5.1.1	Porches "outdoor room"	2	1500	3000		1.1.1	Should accommodate 150 people. Should be centrally located. Opportunity for visitors to reflect upon the experience and view the landscape.
	5.1.2	Pavilion	1	4200	4200		2.1.3; 1.2.1; 1.2.2	(Relocated Existing Program) - flexible exterior covered space. Protected from the weather. Utilize for interpretive programs during inclement weather. Opportunity for private events. Consider roof access for additional visitor perspective.
5	**Site Infrastructure**					**2,500**		
	5.2.1	Site Entry Approach	1	2500	2500			Formal entry from the parking lot to the arrivals. Opportunity for visitors to decompress and become oriented with the site and museum experience. Incorporate separate site entry for large groups.
				Combined Total		**9,700**		

Figure 5.3
COSTUMED INTERPRETER IN THE IRISH FORGE EXHIBIT

6

VISITOR EXPERIENCE

The success of the existing visitor experience at Frontier Culture Museum of Virginia (FCMV) is the incredible, hands-on nature of the site experience which is multi-sensory, and brought to life by costumed interpreters (refer to Figure 6.1). Today, visitors desire better orientation, additional visitor services for their use while on site, and are often left wanting for more time for reflection.

The number one goal of this facility is to fill in the missing story of the Transatlantic crossing, but by relocating and grouping disparate functions in a single location, site-wide operations will be more efficient. The proposed removal of the Dairy Barn support facilities underscores the visitor experience narrative which is often distracting to current visitors. The Crossing Gallery building has been strategically placed to address these needs and will support the visitor experience as one enters, traverses and departs the museum.

The siting of the proposed Crossing Gallery building took place following an extensive site analysis by the A/E team. Existing solar exposure, hydrology, geology, vegetation, noise levels, views, and the impact on the existing and proposed visitor experience where all accounted for within the analysis and ultimate siting of the facility.

Figure 6.1
COSTUMED INTERPRETER WITH SCHOOL CHILDREN

ENTRY AND OLD WORLD

The approach to the Crossing Gallery building begins from the reconfigured parking lot where the visitor moves through an allée of trees which transitions into a trellis at the building entrance. At each stage the proposed design is working to pull visitors away from the mundanity of every day into the immersive experience of the museum. Visitors enter into a gracious double-height space encompassing the main visitor services area and adjacent to temporary exhibit space. This large, light-filled area will serve visitors as a place to meet their companions, get oriented, take care of any immediate needs, and receive an introduction to the history and interpretive themes. It will also be flexible to function as open space for larger events. The space will be dominated by south-facing glass providing views to encourage visitors to venture out to the exhibits on site, initially towards the Old World loop.

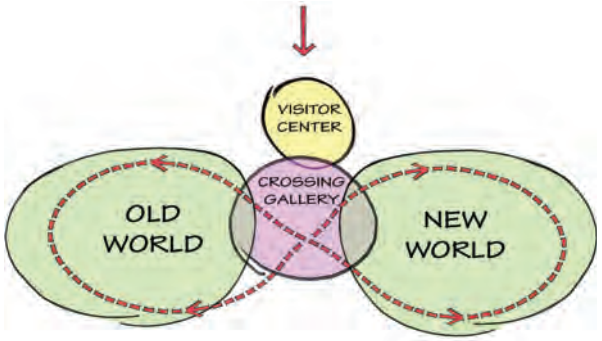


Figure 6.2
CENTRAL APPROACH DIAGRAM

EXISTING SITE PLAN LEGEND

- Existing field/ pastoral landscape
- Existing Tree Canopy to Remain
- Existing Buildings to Remain
- Existing Visitor Paths to Remain
- Existing Maintenance Drive to Remain
- Existing Elements to Remain
- Existing Property Lines

PROPOSED SITE PLAN LEGEND

- Proposed Planting
- Proposed Evergreen Screening
- Proposed Visitor Pathway
- Proposed Visitor Walking Pathway
- Proposed Maintenance Drive
- Proposed Buildings
- Proposed New Elements

Figure 6.3
SITE PLAN DIAGRAM
The center of the site naturally acts as a crossing between the Old World and New World Exhibits. Locating the Crossing Gallery in this portion of the site is logical and supportive of both the visitor experience and maintenance operations.

CROSSING GALLERY EXHIBIT

As visitors return from the site, they will again make use of the various visitor services provided. The addition of these opportunities for guests to pause between the two circuits and the introduction of light fare to be served at the café, will allow more visitors to devote a full day to the museum and encounter all of the exhibits on site. After visitors have regrouped on the first floor they will follow the natural flow towards the main staircase. The staircase, taking inspiration from the tectonics of a ship's hull, will follow the curve of the glazing at the south wall, leading up to the second floor. The Crossing Gallery exhibit encompases much of the second floor and is comprised of several types of interpretive spaces to incorporate the Transatlantic Immigration Experience, including room for staff to do live interpretation. The Crossing Gallery exhibit is described in more detail in the Interpretive Experience section, see page 50. Once visitors have experienced the gallery, they'll move out, at grade, from the second story onto the hill towards the New World loop to encounter the narratives of those who ventured onto the frontier. The exit from the second floor also leads out onto the roof of the pavilion, which will be captured as flexible, occupiable space.

NEW WORLD

Visitors returning from the New World Loop can avail themselves of comfort services at either the second floor or return down the main stair to the first, towards the exit. Apart from the typical visitor path through the museum, the first floor also includes the flexible education space, which steps out directly to the covered pavilion. These two spaces can function together or independently to accommodate school groups, museum functions and private events, flexing with the museum through the daily changes in weather and the changes in the season to continually suit the programming needs of the staff. The pavilion opens up out to the lawn, a structured landscape that will serve as an outdoor classroom as well as picnic space for general visitors. The first floor also contains the administrative and support spaces, tucked into the hill at the northeast corner. The relocation of staff program from the dairy barns allows for the removal of the 1950's barns to further clarify the visitor experience. The location of these functions provides both separation from the public program and quick access to public areas and exhibit spaces for staff, refer to Figure 7.15 and Figure 7.16 for the programmatic floor plans.

GALLERY BUILDING

The Crossing Gallery building will be constructed in warm materials, rustic wood and stone, to reflect the native Virginia character. Deep overhangs and porches will blur the lines between interior and exterior spaces creating space for visitors to pause and decompress after each portion of the museum experience. These spaces are crucial both experientially for visitors to reflect on their experiences on site so as to gain a deeper understanding of what they've encountered and functionally for groups, large and small, to gather as they move through the building and across the site.

REFLECTION

The Crossing Gallery building will sit at the crux of the site, engaging visitors as they approach the museum and at each juncture of the site experience. This is the heart of the site experience. The building is intentionally nestled into the landscape, working in harmony with the topography, in order to remain deferential to the site. The building will enhance the museum's mission by improving the visitor experience and providing the staff with flexible and functional space with which to better serve guests in order to move the museum next phase of growth.

IMPLEMENTATION

In order to fully understand the intended visitor experience from Old World to Transatlantic Crossing to the New World exhibits, the A/E teams recommends the site improvements for a new arrival, building location, activated lawn, primary visitor path, and new maintenance and collections area. In order to incorporate the proposed site design strategies, there are also three significant changes to the existing site plan that are essential to the further development of the visitor experience. (1) The demolition of the existing Dairy Barns, (2) the removal of the Cochran Pavilion, and (3) the removal of the central staff parking area. Each of these items is located within the central portion of the existing site and distract the visitors from the intended exhibits.

As with any major building project, the phasing and determination of the timing for the removal of the existing facilities will be an important consideration for the project team and FCMV members to consider. It is understood that the Museum will remain operational during construction and implementation of the proposed design. Thus, support facilities should remain on-site until new facilities have been provided to accommodate the existing building program needs.

Lastly, the relocated parking areas are incorporated into two new parking areas. The primary parking area incorporates daily visitor and staff parking. The secondary parking area is located adjacent to the primary parking area on land owned by the American Frontier Culture Foundation (AFCF) and provides parking area for tour buses and overflow parking for special events. This proposed secondary parking lot will be paid for an maintained in perpetuity by the AFCF

Parking to be paid for the foundation and maintained for perpetuity.

Figure 6.4
EXISTING SITE PLAN

The existing site plan illustrates that a staff parking lot and out of context Dairy Barn complex are centrally located and the crux between the old and new world exhibits.

170 85 0 170
1" = 170'-0" SCALE OF FEET

Figure 6.5
PROPOSED SITE: KEY PLAN

Throughout the site there are a handful of key design moves that further support the importance of the site and existing exhibits to the interpretive message. Furthermore, the site design approach reinforces that the proposed Crossing Gallery building is simply a lens to support the site experience.

170 85 0 170
1" = 170'-0" SCALE OF FEET

QUINN EVANS ARCHITECTS

FRONTIER CULTURE MUSEUM

Figure 6.6.1
Entry Alley with paved walkway, St. Louis, MO

Figure 6.6.2
Raingarden at parking, Silver Spring, MD

The proposed parking lot design incorporates an integrated stormwater management approach through the use of bioswales and raingardens. Proposed grading of the site takes into account the natural drainage for the area and incorporates bus parking and a primary drop-off area. The proposed design of the parking incorporates visitor, staff, and overflow parking. The total parking available on site would increase by approximately 100 spaces to accommodate the expected increase in annual visitorship. Pedestrian safety is incorporated into the design, allowing visitors to easily descend from their vehicles and begin to approach the proposed facility and site entry through a formal alley of trees.

Figure 6.6
1. PARKING AND ARRIVAL

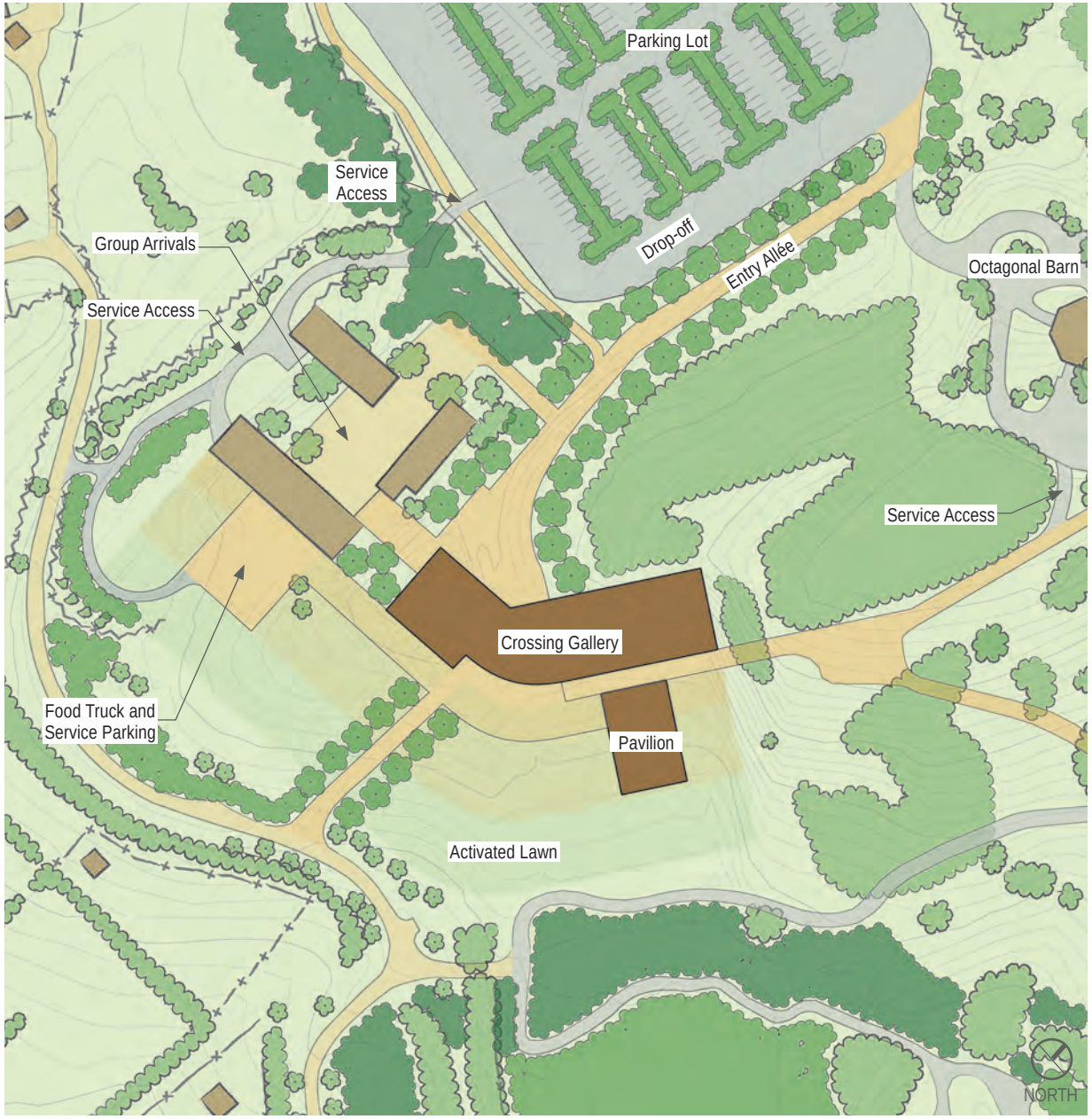


Figure 6.7
2. CROSSING GALLERY AND SITE ARRIVALS

Figure 6.7.1
Shangri La Nature Center, TX

A new formal arrival to the proposed Crossing Gallery facility allows visitors to remove themselves from the mundanity of every day into the immersive experience of the museum. A gracious focused entry with a trellis begins to orient the visitors as a sense of gathering and arrival. The proposed building is responsive to the site, is tucked into the existing hillside, and acts as a single point of entry for the site that opens up to the view of the FCMV landscape. All large groups are directed to the existing Welcome Plaza between existing buildings that are to be reprogramed as educational/multipurpose space. The courtyard and adjacent facilities allow groups to be organized, store lunches and bags in a secure manner, and utilize separate restroom facilities. Both formal and informal gathering opportunities are integrated into the site design at the core of the site. A structured lawn area to the south of the building allows for visitors and events to activate the lawn.

Access for maintenance vehicles and private events has been accommodated utilizing an existing maintenance access drive and plaza area to the southwest of the group arrivals. Food trucks, catering vehicles, and maintenance machinery will have access to the southern plaza/porch area of the Crossing Gallery building. Similarly, additional vehicular access is provided for the second floor of the Crossing Gallery building through the existing drive access adjacent to the Octagonal Barn. Private events and maintenance will be able to easily access the second floor gallery and roof top plaza without use of the elevator. Paving in these areas will be noted as vehicular grade.

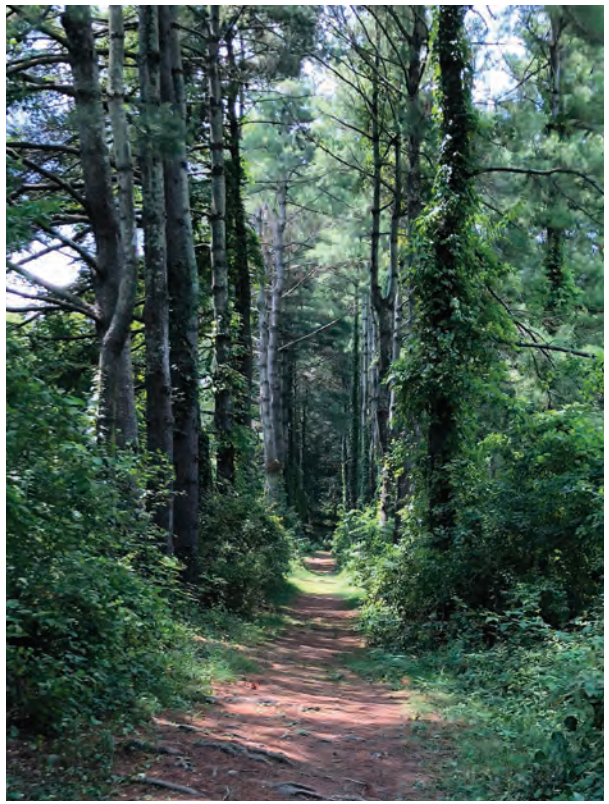


Figure 6.8.1
Existing path along pine tree canopy

As a means to further reinforce the interpretive messaging, a new alignment of the visitor path is integrated as the visitors depart the Crossing Gallery exhibit and begin their decent through the New World exhibits. The proposed visitor path is designed to accommodate electric vehicles and pedestrians along an accessible path network. The layout carefully considers the existing view shed, vegetative cover, distance traveled between current, and proposed exhibits.

The visitor path and vehicular access drive layouts and been refined to have a maximum slope of 8%. The proposed circulation utilizes existing pathways and minimizes site disturbance through excessive grading exercises

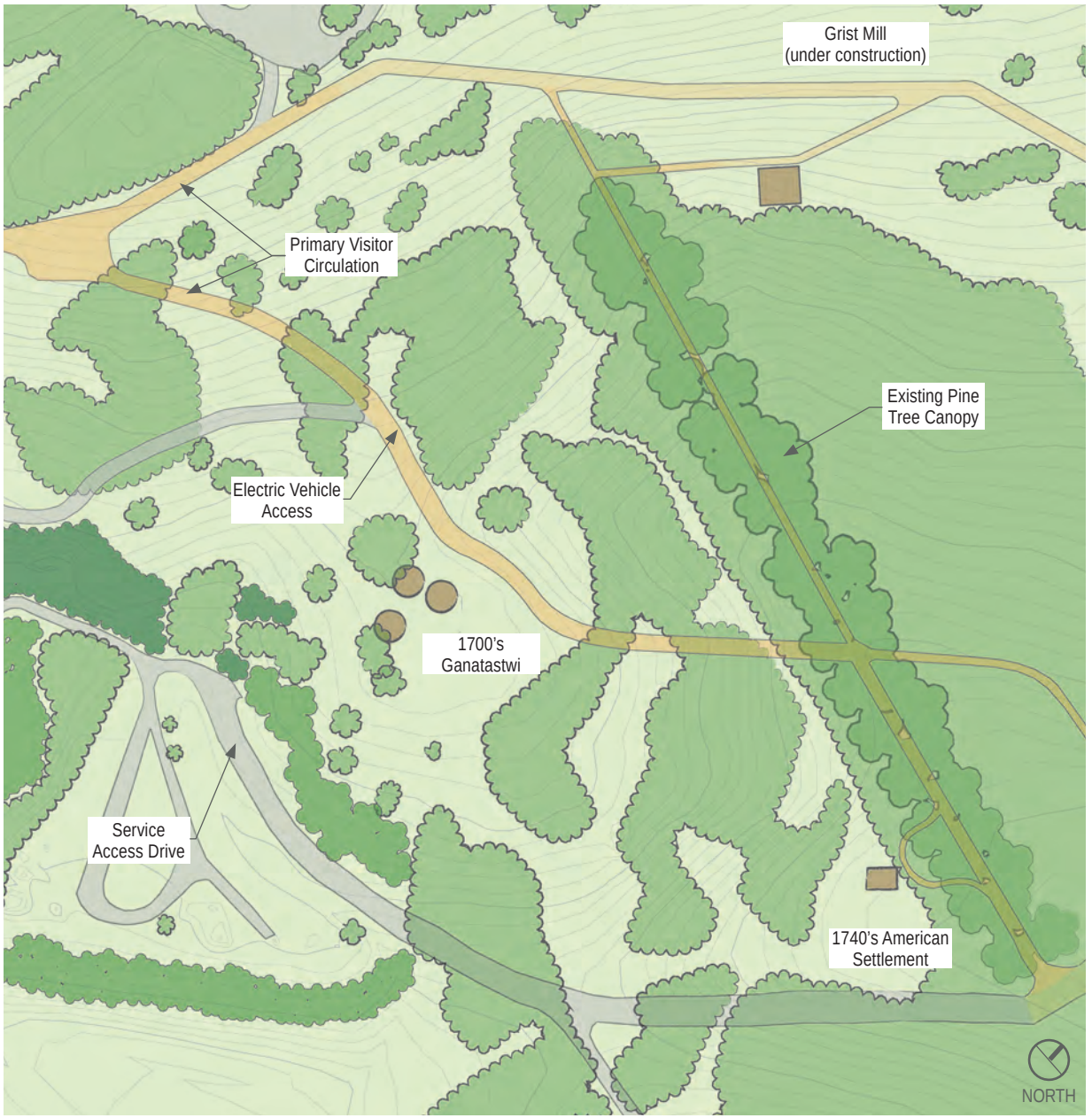


Figure 6.8
3. NEW WORLD VISITOR PATH ALIGNMENT

Figure 6.9
4. MAINTENANCE AND COLLECTION STORAGE

Figure 6.9.1
1850's American Farm

The maintenance and collection storage are currently located in multiple locations throughout the site, the majority of which encompass the central core of the campus. The proposed service access drive has been provided for the eastern part of the site. This additional drive allows daily operations to take place while not interfering with the visitor's experience and safety on-site. Removing maintenance vehicles from the primary visitor path is a priority for both visitor safety and interpretive messaging. The proposed maintenance facility and collection storage is located adjacent to an existing access drive at the northeast portion of the campus, further removing site operations from the visitor's experience. Daily deliveries and removals will take place at the proposed location.

7

FACILITY DESIGN NARRATIVE

The new Crossing Gallery building is designed to enhance the already rich visitor experience at the Frontier Culture Museum of Virginia (FCMV) by completing the narrative of the frontier with Transatlantic crossing stories, while also providing services that will allow visitors to take full advantage of the numerous exhibits spread throughout the museum grounds. As such, the facility consists of a variety of visitor services, (orientation, ticketing, toilet rooms, shop, food services, etc.,) interpretative spaces (temporary exhibit and the Crossing Gallery exhibit), and flexible educational spaces which will serve school groups, museum programming and private event space.

The design of the new and renovated facilities on the site vary, but all further reinforce the project goals and support the overall visitor experience. The site analysis and existing facility assessment assisted in the development of the proposed building location, size, and sustainable design attributes.

The design and layout of the Crossing Gallery building has considered the operation of the facility at different time of the day and week throughout the course of the year. The facility is not designed for a single use, but instead can accommodate various user needs throughout the life of the building. The facility is designed in such a way that the entire building can be open to the public as part of the museum experience, while also accommodating special events in discrete areas without the expense of staffing and operating the entire facility.

Figure 7.1
COSTUMED INTERPRETER AT TINSMITH SHOP

CROSSING GALLERY EXPERIENCE NARRATIVE

INDOOR/OUTDOOR

The facility utilizes connections between the inside and outside on multiple occasions. The entry terrace supports the initial site orientation while also providing a space for smaller groups to gather and decompress before entering the Crossing Gallery building. At the entry, an exterior trellis structure not only encourages a gracious entry, but also begins to introduce a purposefully built form within the landscape. The south façade of the building is shaded with overhangs, encouraging visitors to reflect upon the interpretive experience. Additionally, the Crossing Gallery Exhibit space and roof terrace above the pavilion have opportunities to view both the Old and New World exhibits from a distance (Refer to Figure 7.2), allowing the visitor to reconnect the indoor and outdoor environments. The form and scale of the proposed building is responsive to the site conditions.

Refer to Figure 7.3, Figure 7.4, and Figure 7.5.

Figure 7.2
FCMV Landscape View

Figure 7.4
Bernheim Arboretum Visitors Center, KY
Landscape/ buildling overlap; terrace and trellis structure provides focused building entry.

Figure 7.3
Brooklyn Botanic Garden Visitor Center, NY
Shaded glazing and covered exterior space.

Figure 7.5
Brooklyn Botanic Garden Visitor Center, NY
Organic form integrated with the topography of the site.

BUILDING AS A LENS FOR THE SITE

As previously mentioned, the site at the FCMV is an incredibly important piece to the complete interpretive experience. The proposed Crossing Gallery building will further support the focus and importance of the site. Through the use of appropriate glazing fenestrations, the occupants within the building will repeatedly be reminded of the existing exhibits and site. The repetitive reference to the site conditions encourages the visitors to return to the site and provides opportunities for reflection. Strategic views of the Old World site are observed from the south façade. The main staircase, taking inspiration from the tectonics of a ship's hull, will follow the curve of the glazing at the south wall, leading up to the second floor and overlooking the structured lawn and Virginia landscape. The New World site is easily accessible from the second floor and roof top of the pavilion.

Refer to Figure 7.6, Figure 7.7, and Figure 7.8.

Figure 7.6
Wild Turkey Visito Center, KY

Figure 7.7
The National Campus for Archeology, Israel

Figure 7.8
Wild Turkey Visitor Center, KY

ADAPTABILITY/FLEXABILITY

Each of the primary program elements to the proposed facility are designed with the intention that the exhibits and space can be flexible on an hourly, daily, weekly, and seasonally exchange. The temporary exhibit, Crossing Gallery exhibit, educational space, and pavilion are all intended to be used my interpretive staff for programming needs during inclement weather. Panels and room dividers can easily be moved and removed to accommodate interpreter programming efforts and private event staging. Furthermore, the building itself is adaptable for future, undetermined building program. The spaces and systems are variable enough to accommodate different types of building program, based upon the needs of the museum, for the life of the building, without requiring substantial building renovations/alterations.

The stair connecting the two floors (Figure 7.11) will be constructed of warm materials that begin to reference the function and material of a ship's hull. The stair will function for both vertical transportation, but also serve as a gathering area with integrated seating. The stair is scaled appropriately for the space and is gracious, will be day lite, and clearly identify the destinations at either end of the stair.

Due to the unique design qualities of the proposed facility, the A/E team would recommend the following specialist consultants be included within the design of the Crossing Gallery: exhibit design, lighting, acoustics, café designer, and wayfinding signage.

Refer to Figure 7.10, Figure 7.11, and Figure 7.12.

Figure 7.9
Multipurpose stairs

Figure 7.10
Colorado Sports Hall of Fame, Denver, CO

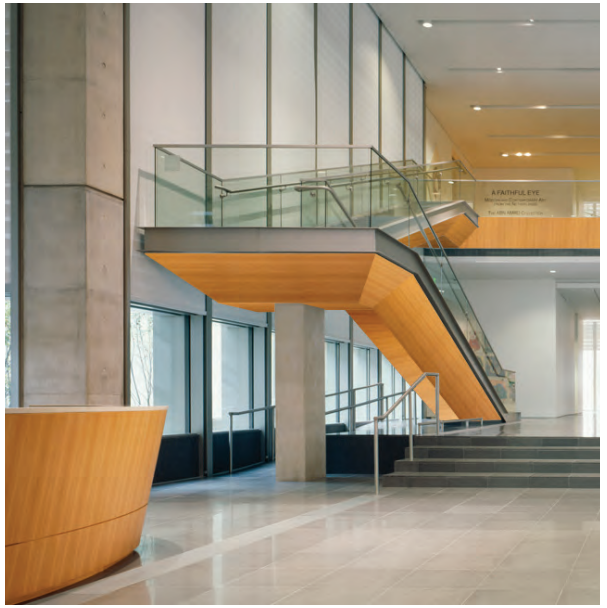


Figure 7.11
Grand Rapids Art Museum, MI (with altered materials)

Figure 7.12
Grab & Go Cafe, Asheville, NC

MATERIALS

The primary material palette for the proposed facility pulls its inspiration from the surrounding Virginia landscape. Warm materials such as regionally supplied wood and stone will serve as the primary materials for the facility, anchoring the building to the site, while showcasing the structural integrity. The durability and maintenance considerations for the building products will be carefully considered while addressing life cycle costs.

Refer to Figure 7.13 and Figure 7.14.

BUILDING ALTERATIONS

The existing Welcome Center will be repurposed and renovated to accommodate additional educational/multi-purpose space. Windows and doors will be added to accommodate additional daylighting and views to the adjacent plazas. The existing restrooms would be renovated in place with water-saving sensors and fixtures. Furthermore, the existing Museum Shop will be repurposed, renovated, and fully enclosed. The existing terrace area covered with a canvas roof would be enclosed. Windows and doors will be integrated into the façade facing the plaza, to support the education program space and indoor/outdoor relationships.

RELOCATION OF FACILITIES

Both the Maintenance building and Collection Storage building would be new purpose-built facilities. These existing program elements are currently located in various locations throughout the campus. The new purpose-built facilities located in the northeastern part of the campus allow for service deliveries/removals to easily occur without interfering with the visitor experience.

Figure 7.13
Phil Hardberger Park, TX

Figure 7.14
Morris Arboretum of the University of Philadelphia, PA

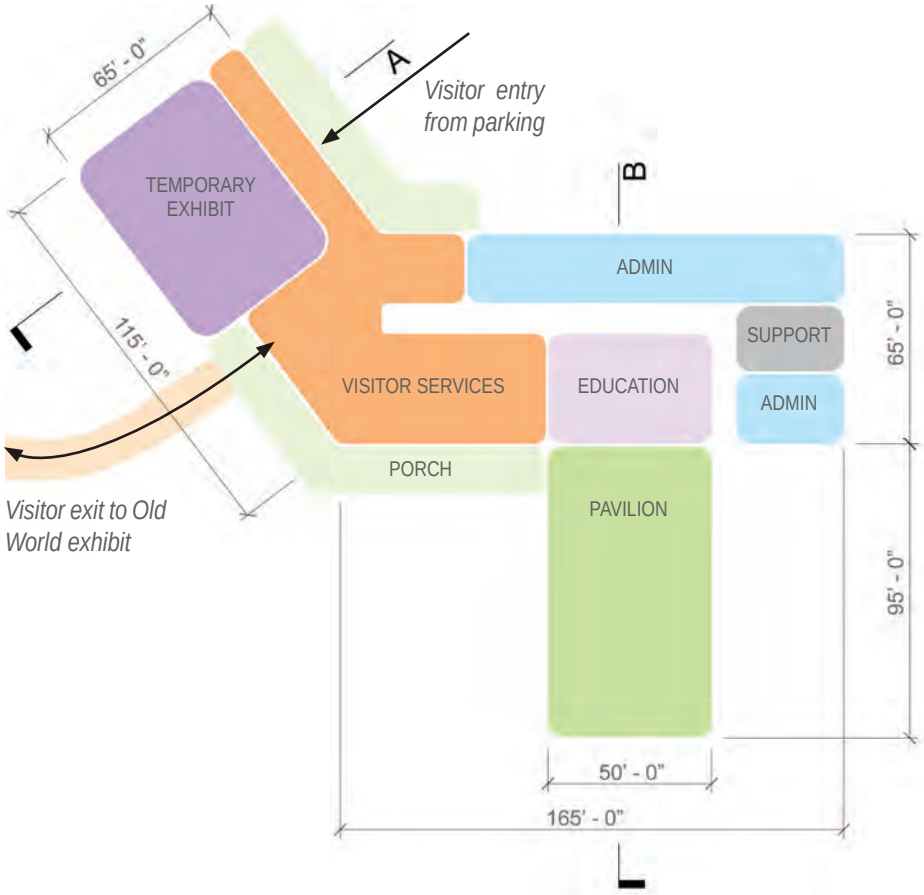


Figure 7.15
PROPOSED CROSSING GALLERY LAYOUT
FIRST FLOOR

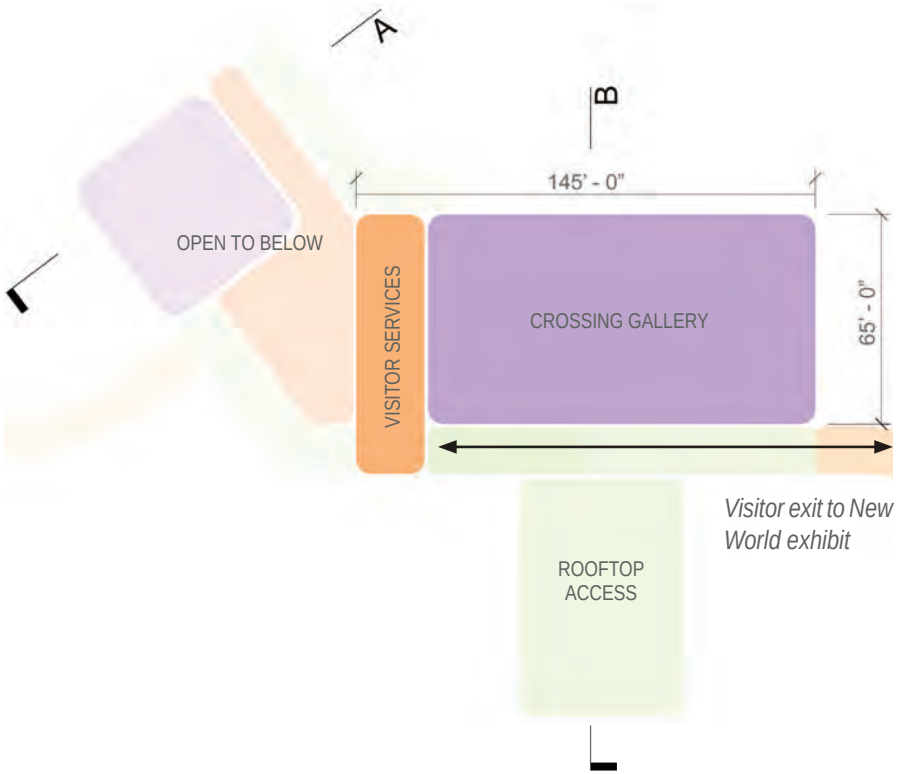
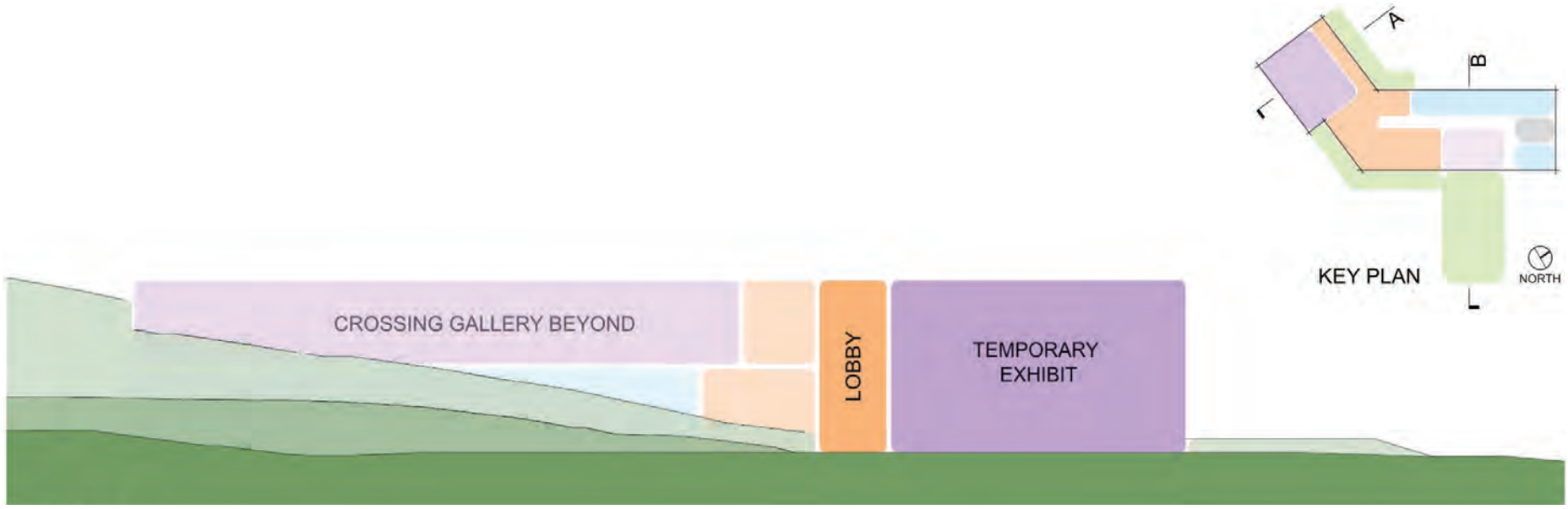
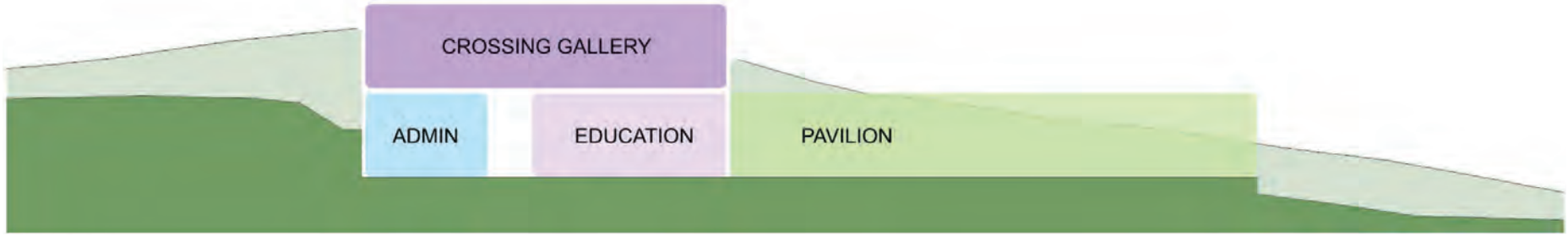


Figure 7.16
PROPOSED CROSSING GALLERY LAYOUT
SECOND FLOOR



Section A



Section B

Figure 7.17
PROPOSED SECTIONS OF CROSSING GALLERY

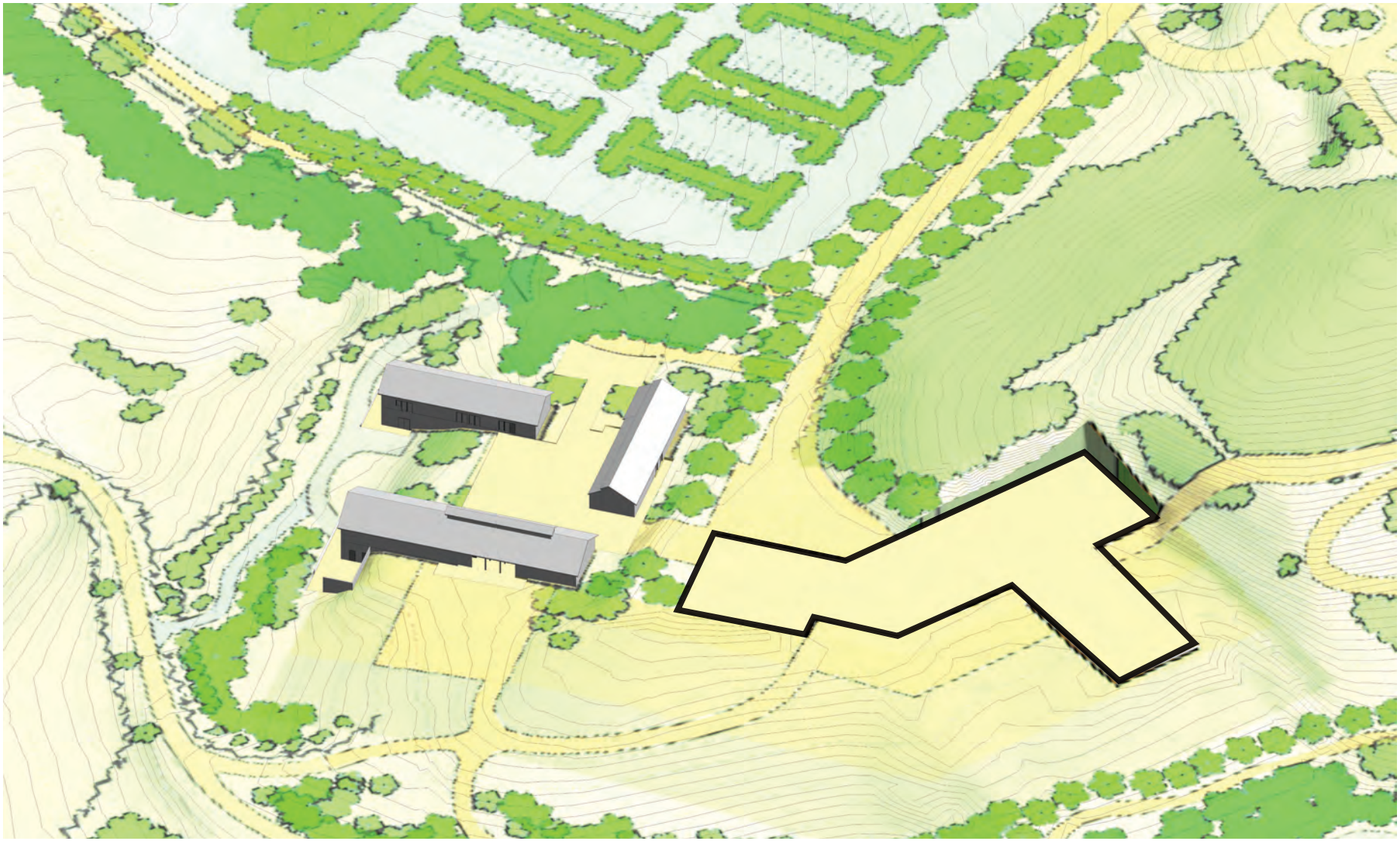


Figure 7.18
PROPOSED CROSSING GALLERY BUILDING FOOTPRINT

Figure 7.19
PROPOSED CROSSING GALLERY BUILDING MASSING

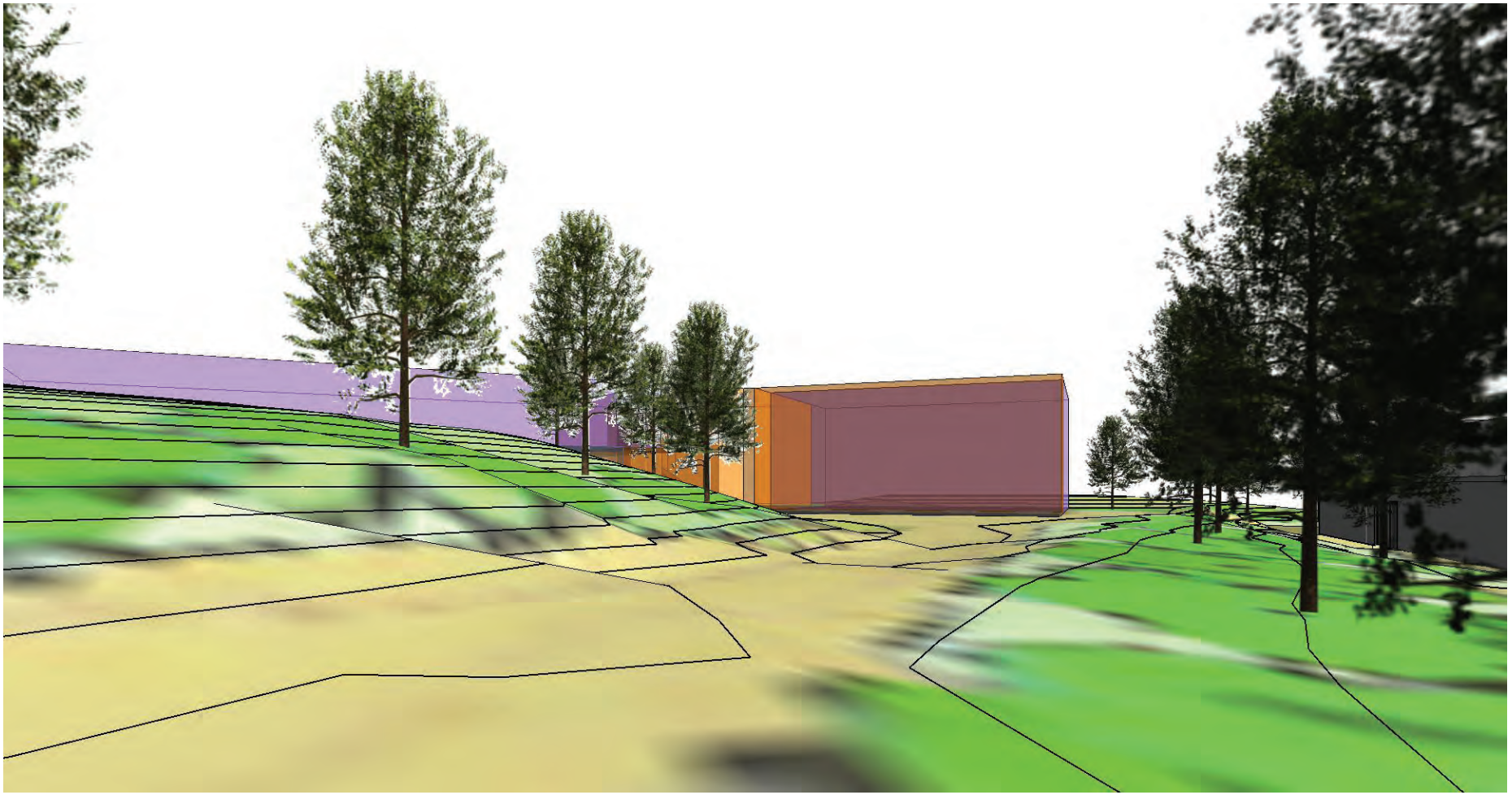


Figure 7.20
VIEW OF CROSSING GALLERY BUILDING ENTRY FROM ALLÉE

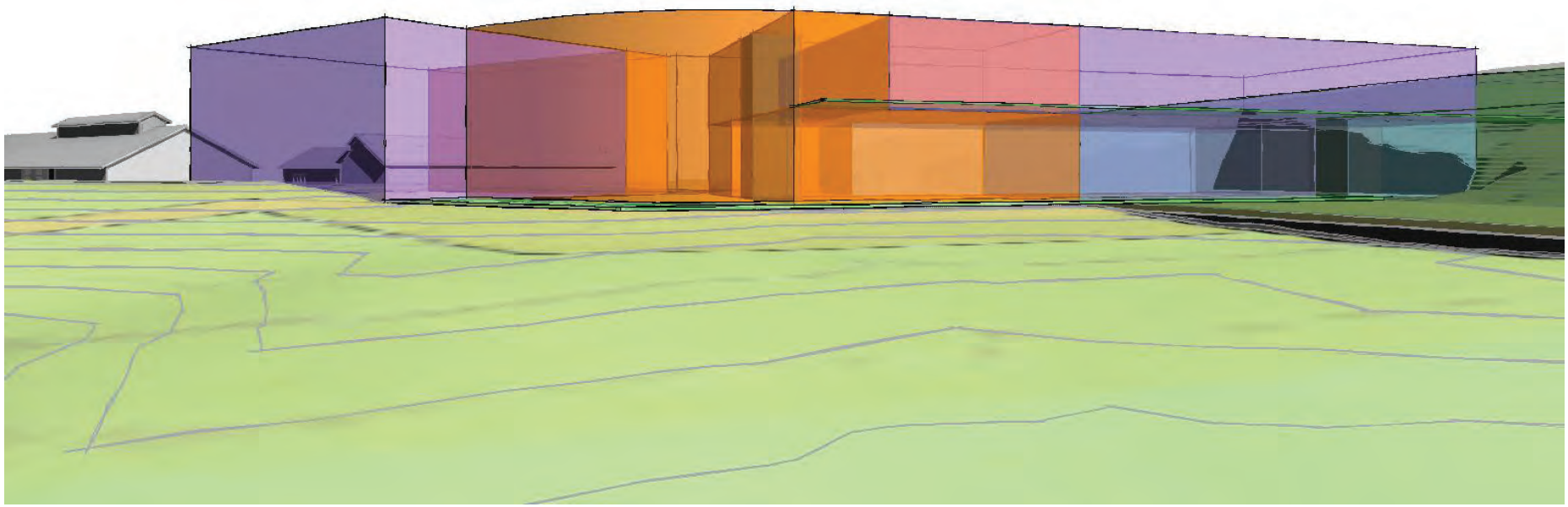


Figure 7.21
VIEW OF CROSSING GALLERY BUILDING FROM LAWN

8

INTERPRETIVE EXPERIENCE

CONTEXT AND VISION

The mission of the Frontier Culture Museum of Virginia (FCMV) is to increase public knowledge of the formation of a distinctive American folk culture that is more than just a blending of European, African, and indigenous peoples.

FCMV accomplishes their mission by telling the stories of the peoples who migrated to colonial America and the life they created there through the use of costumed interpreters who present culturally specific stories in the context of recreated farmsteads of each original culture, as well as American farmsteads and related buildings of various periods. The experience of immigration itself is a notable gap in the current interpretive story.

In order to reach new and larger numbers of visitors, FCMV envisions a Crossing Gallery building that completes the story arc of the Museum by presenting an exhibit focused upon the immigration experience including the contexts of the various reasons of departure, the often-dangerous voyage, arrival in America, and the eventual continued migration to the Frontier. In addition, this facility will provide an overview of the entire interpretive experience of the Museum for visitors who come on days when movement around the site is unappealing because of weather conditions, or the amount of walking required on site. Refer to Figure 8.1.

DESIRED INTERPRETIVE EXPERIENCES

- Orientation to the entire Frontier Culture Museum site and the wide variety of experiences it has to offer.
- An exhibit that tells the full story of the immigration experience itself, including departure and arrival.
- An exhibit space that provides a stand-in for the interpretive experience of the site during inclement weather.
- A preference for live costumed interpretation over static exhibits wherever possible.
- Occasional opportunities to utilize and display parts of the Museum's artifact collection.
- Frequent use of reproduction objects as tactile interactives.
- Additional flexible space to provide visitors with costumed interpretation programs during inclement weather, particularly school groups.

INTERPRETIVE OVERVIEW

The new Arrival/Orientation/Exhibit facility at the Frontier Culture Museum will offer a variety of interpretive experiences.

ORIENTATION

On the plaza outside the building will be a large tactile map of the entire museum site (refer to Figure 8.2), introducing potential guests to the varied experiences, numerous recreated sites, immersive exhibits, extensive costumed interpretation, and comprehensive visitor services that FCMV has to offer.

FLEXIBLE PROGRAMMING SPACE

A key feature of the new facility will be flexible spaces that can be transformed at short notice to provide locations for temporary exhibits, scheduled educational presentations, school group activities, and impromptu costumed interpretation programs. Not only does this space offer tremendous opportunities for enhancing and expanding regular interpretive programming opportunities, it also provides the space needed to bring costumed interpreters (refer to Figure 8.3) indoors to engage directly with visitors when weather conditions or other situations make access to the recreated sites scattered across the museum site difficult to reach. Although not a replacement for the authentic nature of the farmsteads, the use of natural materials and sizable windows create a direct connection to the outdoors and provide a sympathetic environment for the Museum's costumed interpreters to interact with visitors.

INTERPRETIVE EXHIBIT

The Immigration Experience exhibit is envisioned as filling approximately 8,000 s.f. and is divided into three primary galleries: Departure, The Crossing, and Arrival/West to the Frontier.

While the Departure and Arrival/West to the Frontier sections are rich in subjects and stories for interpretation, the central

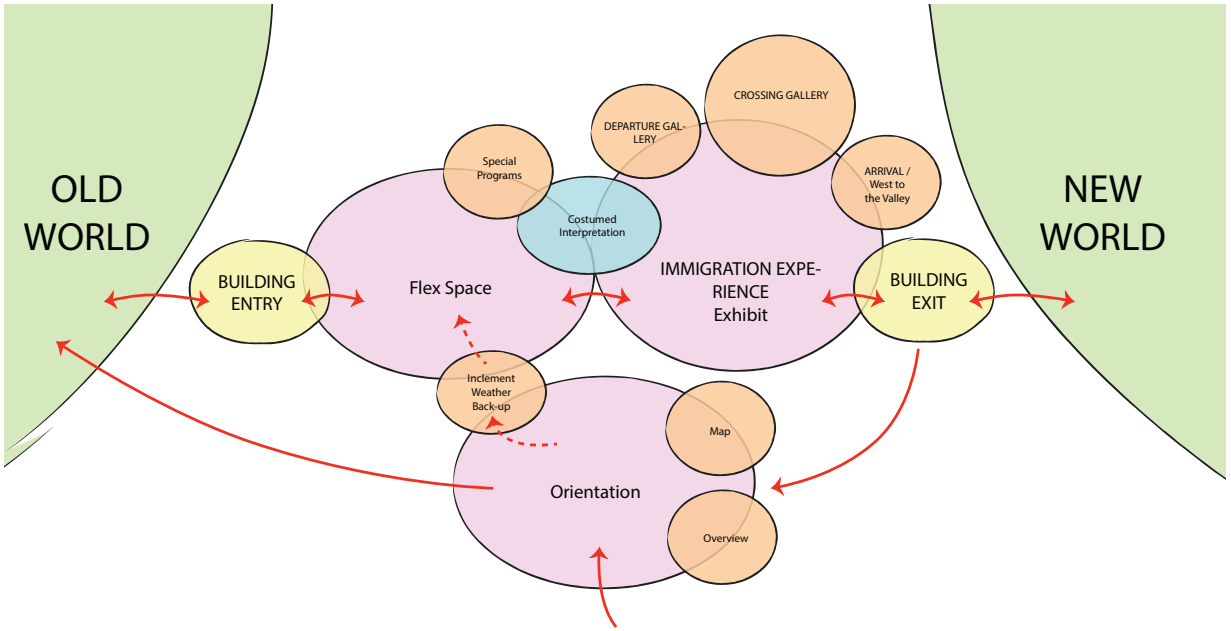


Figure 8.1
Movement around the Site Diagram

Figure 8.2
The Cafe at Monticello, VA

Crossing Gallery will almost certainly require a larger space due to the scale of the recreated settings related to migrant ships and the immersive environment surrounding them. A potential spatial relationship might be:

- Departure ~ 2,000 s.f.
- The Crossing ~ 4,000 s.f.
- Arrival/West to the Frontier ~ 2,000 s.f.

THE DEPARTURE GALLERY

PROPOSED INTERPRETIVE CONTENT

- Who are the groups of people that come to America?
- What is the religious, economic, and social milieu?
- What do they know about America?
- What arrangements do they make, how much does it cost, and how do they afford it?
- How do they begin their journey and where do they begin their ocean voyage?

PRESENTATION AND TECHNIQUES

The exhibit will begin with a set of introductory graphic panels (refer to Figure 8.4), featuring an introductory statement about migration to America, maps of primary routes (refer to Figure 8.5), and statistics about numbers, groups and dates involved. The intention here is to provide an overall context and framework for visitors to understand the entire exhibit. It will also define the particular interpretive emphasis of this exhibit, which springs from the recreated farms on the site, and focuses on migrants (free and forced) from Europe and Africa in the Colonial period.

A combination of layered 2-dimensional interpretive graphics featuring brief (50 word) passages of text, maps, period imagery, and commissioned murals (refer to Figure 8.6) will provide and identify an overall cultural context for each of the

Figure 8.3
The Children's Museum of Indianapolis, IN

Figure 8.4
American Revolution Museum at Yorktown, VA

primary groups: English, Irish, German, and African. However, as it is not reliant on the recreated farmsteads featured on the Museum site, the exhibit is not tied to the specific groups and time periods and groups featured there—the groups and time periods examined can become as broad as the Museum and its design team determine is appropriate. This section will introduce to visitors (refer to Figure 8.7) who the people that come to America are, why they come, what they are leaving behind, and how they come.

A few small artifact cases may leverage appropriate items from the Museum's artifact collection to highlight particular traditions of the Old World cultures. Instead of just items in cases, however, there will be regular use of reproduction objects that visitors will be able to touch and feel to gain a more direct sense of connection to the people and ways of life they are learning about. The gallery will have highly controlled lighting, not to simply make it dark, but to protect the few objects on display and to create drama in the story being presented. There may be one or two basic and durable media programs that aid in interpretation (refer to Figure 8.8), such as ambient audio or a basic touch-screen program that allows visitors to engage in active exploration of the changing nature of immigration to America over time by selecting certain variables (time, location), discover the cultural origin of their own name, or play a brief game by making necessary decisions at various points along the journey.

A key feature of this gallery, however, will be a carefully designed station where one or two members of the Museum's highly skilled costumed interpretation staff (refer to Figure 8.9), can present engaging personally interactive programs that not only encourage, but rely upon, direct interaction with visitors. This unique approach to exhibit presentation will link the indoor experience to the outdoor. Refer to Figure 8.10.

TAKE-AWAYS

Leaving the Departure Gallery visitors should have an appreciation of the diversity of Old World cultures of the many groups who emigrated to colonial America, an understanding of the challenges that set them on the path to America, and an awareness of the means by which the journey was begun.

Figure 8.5
Lincoln's Cottage, "American by Belief", Petworth, D.C.

Figure 8.6
Gettysburg Seminary Ridge Museum, Gettysburg, PA

Figure 8.7
Museum of Alabama, Montgomery, AL

Figure 8.8
Museum of Alabama, Montgomery, AL

Figure 8.9
Pacific Aviation Museum, Pearl Harbor, HI

Figure 8.10
The British Museum, Indian Treasures, London, UK

THE CROSSING GALLERY

PROPOSED INTERPRETIVE CONTENT

- What kind of ships are used to transport passengers across the Atlantic?
- Who owns and sails these ships?
- What kinds of records are kept and what survives?
- What are the physical conditions of the passage for different groups and in different time periods?
- How do changes in maritime and navigational technology affect the crossing experience?
- How do the conditions, treatment, and numbers of the enslaved differ from free and indentured passengers and how do they change over time?
- What is the nature of interaction between passengers and crew and are there revolts?

PRESENTATION AND TECHNIQUES

The Crossing Gallery is the key to the entire exhibit and an essential intersection between the Old World and New World settings outdoors.

It interprets the dangerous voyage across the Atlantic and widely varied conditions under which it was made. The exhibits here are provided with the context of a themed environment or structure, representing some portion of the passenger compartment on a ship transporting migrants to America (refer to Figure 8.11). A signature media program featuring background audio, dramatic lighting projected onto wall-sized murals of the ocean and possibly even occasionally integrated with the actions of the Museum's costumed interpreters will help the visitor imagine themselves aboard the vessel. This is not a stylized Disneyesque sideshow, but an interpretive environment designed with education in mind allowing visitors to touch and explore reproduction artifacts and directly engage with multiple costumed interpreters (refer to Figure 8.12) in an environment as comparable to the recreated farm sites as possible.

Targeted educational programs presented by live interpreters, along with layered interpretive graphics and brief (50 word) explanatory texts, will convey the story of the crossing (refer to Figure 8.13). What were the ships like? How were they steered and by whom? How long did it take? How bad were the conditions? Was everyone treated the same? What were the lives of sailors like? What did passengers do to pass the time? And did the passengers get along with the crew?

Specific and special attention will be paid to the very different experience of enslaved Africans being transported across the Middle Passage to a harsh and unsought new way of life. The inhumane conditions of slave ships might be conveyed through scale models, reproduction objects open to touch, and the well-developed educational programs presented by the Museum's costumed interpreters at one of the several stations specifically designed for interpreters in this gallery. A multi-touch interactive computer (refer to Figure 8.14) will allow visitors to explore in greater detail the shipboard conditions experienced by the enslaved, and also to learn the story of La Amistad, the slave ship on which enslaved Africans rebelled and took control, landed in America, and successfully sued for their freedom.

TAKE-AWAYS

From the Crossing Gallery, visitors should gain empathy for the migrants facing the hardships and harsh conditions to be endured on a transatlantic voyage, particularly by those making the journey against their will. Understanding of specific STEM concepts will be reinforced through interaction (refer to Figure 8.15) with period technology as employed in ship-building, sailing, and navigation.

Figure 8.11
Lewis & Clark State Historic Site & Interpretive Center, Hartford, IL

Figure 8.12
Betsy Ross Interpreter

Figure 8.13
Museum of Alabama, Montgomery, AL

Figure 8.14
Canadian Museum of Immigration at Pier 21, Halifax, Nova Scotia

Figure 8.15
Mystic Seaport Museum, Mystic, CT

THE ARRIVAL/WEST TO THE FRONTIER GALLERY

PROPOSED INTERPRETIVE CONTENT

- Where in America do ships transporting people arrive?
- What is the experience of disembarkation like and how does it change over time?
- How do free immigrants find immediate accommodation and what is it?
- What is the experience of indentured laborers arriving in America?
- What is the experience of enslaved Africans arriving in America?
- Did all free immigrants arriving in America become a farmer or head for the frontier?
- What else could they do?
- How did newcomers (or anyone) acquire land?
- How could new arrivals afford the move, and does it happen immediately?
- How is the journey west to the Great Valley and the frontier made and how does it differ between the free, the indentured, and the enslaved?
- How and which Old World traditions translate to and survive in the New World?

PRESENTATION AND TECHNIQUES

Arrival/West to the Frontier, the third and final gallery of the exhibit, picks up the story of migrants upon arriving in the New World. In terms of presentation and exhibit methodology, this gallery will be very similar to Departure, forming a bookend to the visitor's interpretive experience.

It will feature two-dimensional graphic panels with maps, statistics, and period imagery. A few small artifact cases will highlight colonial era artifacts from the Museum's collection (refer to Figure 8.16). Reproduction objects open to touch and handling by visitors will be plentiful. A simple media program will engage visitors in deeper explorations of a specific subject, possibly by searching for their ancestors in online passenger lists or the Immigrants Servants Database (http://www.pricegen.com/about-immigrantservants). And again, specific stations are provided for the use of costumed interpreters (refer to Figure 8.17) in presenting appropriately targeted and engaging programs.

Interpretively, this gallery will introduce the varied nature of ports in Colonial America, the experience of disembarking (refer to Figure 8.18) in a strange new land, and the challenges facing each, with just some of the many possibilities being: seeking immediate temporary shelter for your family, searching out employment in a growing port city, having the indenture (a contract selling your labor for as much as seven years) that financed your voyage sold (along with your freedom) to a small farmer, or facing the reality of slave pens, dehumanizing auctions, family separations and a new life of slavery experienced by Africans brought to America against their will.

This gallery (refer to Figure 8.19) also maps the journey made by many immigrants from the coast to the frontier. For colonial Virginia, that was the Great Valley. The story of how the migrants moved into the valley, acquired and cleared land, and blended together their varied backgrounds into the distinctive folk culture of the American frontier, is carried forward, allowing visitors to move on and explore the recreated New World farms and buildings in the second half of the FCMV.

TAKE-AWAYS

As they leave the Arrival/West to the Frontier Gallery at the end of the Immigration Experience exhibit, visitors should recognize the challenges that faced newly arrived immigrants in colonial America, from the difficulty of establishing a successful way of life for their families, to the disheartening future of indentured laborers, to the dehumanizing cruelty experienced by the enslaved. Visitors should understand the fortitude with which each group and each culture faced their particular situation, and leave the building prepared to experience the unique new culture and folkways that these disparate groups forged on the frontier of Colonial America.

Figure 8.16
Museum of Alabama, Montgomery, AL

Figure 8.18
Lewis & Clark State Historic Site & Interpretive Center, Hartford, IL

Figure 8.17
Oregon Trail Center, Baker City, OR

Figure 8.19
The Peopling of American Center, Ellis Island, NY

9

SUSTAINABILITY

As a building project funded by the Commonwealth of Virginia that is larger than 5,000 s.f., the Frontier Culture Museum of Virginia (FCMV) Crossing Gallery building is required to meet either LEED Certified, Green Globes, or Virginia Energy Conservation and Environmental Standards (VEES).

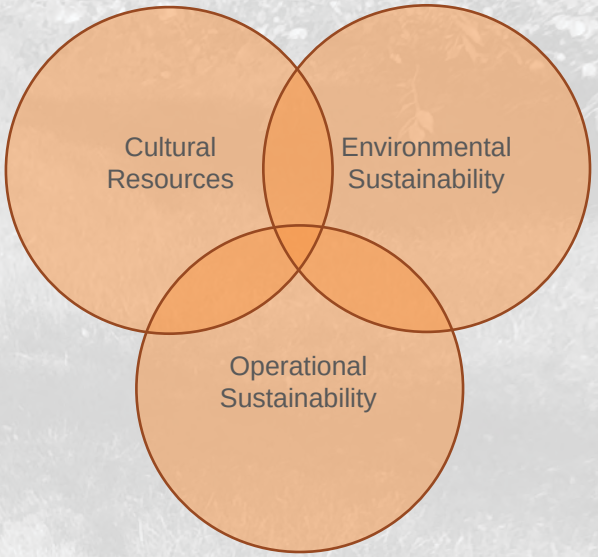
The story of sustainability is integral to the mission of the FCMV. The settlers of the frontier where incredibly resourceful and resilient. These same characteristics can easily be showcased as part of the building and site design through the various themes of sustainability.

The site is located along the BRITE Staunton Transit Network, supporting public transportation initiatives and equality for all members of society. Furthermore, the site design and interpretive messaging naturally lends itself to an opportunity to protect and restore native habitats through appropriate site plantings and limiting light trespass, while simultaneously addressing stormwater management quantity and quality constraints. Exterior site improvements are conscious efforts made deliberately to encourage visitors to further explore the site exhibits.

Within the building, further efforts are made to reduce the required system uses on the building. Passive systems such as building mass, natural daylight, views, and ventilation systems contained within a well-insulated structure are utilized to reduce the energy demands. Additionally, low flow, dual flush, and waterless plumbing fixtures that utilize collected rainwater help to reduce the use of potable water. Furthermore, active systems such as geothermal and solar are provided to reduce the amount of dependency on non-renewable energy sources. Sustainably managed and regionally specific materials to the Virginia landscape makeup the primary material palette for the Crossing Gallery building.

A primary goal for this project is to further enhance the long-term operational and maintenance costs for such a facility. This project has been designed with the understanding that no additional staffing needs would be required for the FCMV. The building is flexible and is designed to accommodate future building use, rather than a single-purpose built facility. The systems operations will be designed to minimize the amount of annual maintenance, energy costs, and replacement materials.

As a means to align with the FCMV's mission, the design and operations goal for this this project is full certification under the Living Building Challenge.



10

ENGINEERING ANALYSIS

Structural Narrative
- Renovation of Existing Construction
- Proposed New Gallery Construction - Crossing Gallery
- Required Testing and Investigations
- Structural Design Guidelines
- Structural Material Specifications

Mechanical/ Electrical/ Plumbing Narrative
- Renovation Program with Electrical
- Proposed New Building Program with Electrical

STRUCTURAL NARRATIVE

The proposed scope of work for the Frontier Culture Museum of Virginia includes the renovation of two existing buildings and the addition of a new building on the site. The new building will provide temporary exhibits, visitor services, educational facilities, administrative spaces, a large pavilion space and will house the new Crossing Gallery. New maintenance and collection storage facilities will also be provided.

I. RENOVATION OF EXISTING CONSTRUCTION

VISITOR CENTER BUILDING

The 1987 construction consists of reinforced concrete foundations supporting concrete masonry foundation walls with primarily wood-framed construction above. The proposed work will re-purpose the video orientation room and the ticketing/sales area as education/private event space. The renovation will likely require new openings in the walls on the north and south to have more direct access onto the plaza areas. The restrooms will remain and will likely be renovated (again) as part of the project budget.

The original building drawings show that the north and south walls are load bearing, supporting engineered roof trusses spaced @ 24" o.c. As such, gravity loads would be supported with the addition of a new wood lintel and posts, bearing on existing continuous foundations. Depending on the size of the openings, the walls should be reviewed with respect to their contribution as shear walls for the east-west lateral system. This contribution is a function of the percentage of wall removed relative to what is remaining, but also the relationship between the wood sheathed walls and the CMU walls around the bathrooms on the east end.

Enclosure of the existing breezeway, if considered will result in a localized increase in wind loads beyond the IEBC threshold that would require an analysis of the lateral system with respect to current IBC wind load requirements. New enclosure walls would require new continuous wall footings.

MUSEUM SHOP

The 1987 construction consists largely of concrete foundations with wood and heavy timber framing above. Significant portions of the existing structure are currently open, creating an area for sheltered, outdoor seating.

The proposed renovation includes enclosing the outdoor seating areas. The added wall area will result in a substantial increase in lateral wind loads on the building and require structural analysis of the lateral system based upon the requirements for new construction in the IBC. The additional exterior walls however will provide opportunity for adding significant lateral load capacity, as shear walls or moment frames, and should readily be able to accommodate the loading increase with conventional construction methods. The new walls will require new reinforced concrete continuous wall footings. The shear wall capacity of new or existing walls is a function of the amount of continuous length of wall in plan and the wall connections for floor and roof diaphragms. As such, the analysis will need to be coordinated with proposed wall penetrations such as doors and windows.

II. PROPOSED NEW BUILDLING CONSTRUCTION - CROSSING GALLERY

The proposed new building construction is a two-story structure bending around and engaged in the hillside topography of the site. The structure is highlighted with zones of double-height spaces for the lobby and temporary exhibit space.

FOUNDATIONS

Foundations will likely consist of shallow reinforced concrete spread and continuous footings for columns and walls. Portions of the structure will be engaged into the hillside and below grade, requiring reinforced concrete foundation walls designed to retain soil and surcharge pressures. A geotechnical investigation is recommended to define soil bearing capacities, rock profiles, and other design parameters as noted below. Frost depth is equal to 24 inches.

GRAVITY SYSTEMS

Floor and roof construction will likely consist of wood deck on wood beam or wood truss construction. Manufactured lumber for beams and trusses will likely be employed for longer span components to maximize strength and stiffness, while maintaining the warmth and materiality of wood construction that is regionally and historically prevalent. Wood connections and selective high-strength components such as tension rods or bracing struts for trussed beams or braced frames will likely consist of painted, galvanized or stainless steel, depending upon environmental exposure and desired architectural appearance.

- Laminated wood deck construction can vary between 2 inch and 5 inch depths, with permissible spans, depending on deck thickness, loading requirements and deck continuity, approaching 20 feet. Spans in the range of 10 to 15 feet are more common and allow for greater load capacity.

- Clear spans for areas such as the lobby and temporary exhibit space, depending upon spacing of structure and roofing design, may be initially estimated as having span to depth ratios of approximately 1:10 for wood truss or trussed beam construction.

- The proposed 50 foot clear span for the Pavilion will pose a structural challenge given the proposed terrace and green roof loading, paired with the single story adjoining the education space. The large sustained loads of the terrace and green roof would typically be supported by steel and concrete slab construction, particularly for longer spans such as those proposed. Manufactured lumber trusses and thick laminated wood deck may be an option, however the depth of structure will need to be balance with floor to ceiling heights. Design goals may be achieved by a combination of stepping up at the terrace level and/or stepping down at the first floor level.

LATERAL SYSTEMS

Structural systems for the resistance of lateral loads will likely consist of a combination of shear walls and braced frames, with braced frame designs more likely within double height spaces. For timber-frame construction, braced frames can include diagonals of timber or, more likely, steel tension rods with adjustability using clevis and turnbuckle detailing. Lateral loadings for wind and seismic are as noted below.

III. REQUIRED TESTING AND INVESTIGATIONS

GEOTECHNICAL INVESTIGATION

A geotechnical investigation will be required for the proposed new building construction. A scoping document should be developed to delineate the requirements of the exploration program, including borings within the footprint of the new building. Professional recommendations for the design parameters for building foundations and site retaining walls would be requested, among other information.

Given the observed topography and presence of projecting rock, a number of borings should be selected to understand the proximity of rock profiles within the area of excavation. This will allow for a more accurate projection of rock excavation and associated costs.

IV. STRUCTURAL DESIGN GUIDELINES

A. APPLICABLE CODES AND STANDARDS

The following codes and standards are specified by the local Building Department:

1. The International Building Code (IBC), 2012 edition, as amended by the 2012 Virginia Uniform Statewide Building Code.
2. The International Existing Building Code (IEBC), 2012 edition, as amended by the 2012 Virginia Rehabilitation Code.
3. ASCE 7-10, Minimum Design Loads for Buildings and other Structures

The following structural design codes will be followed as specified by the governing codes and standards:

4. ACI 318-11, Building Code Requirements for Structural Concrete
5. ACI 530-11, Building Code Requirements for Masonry Structures
6. AISC 360-11, Specification for Structural Steel Buildings
7. NDS 2012, National Design Specification for Wood Construction

B. STRUCTURAL LOADING

1. Uniformly Distributed Live Loading

The following values are specified by the applicable codes and standards or are higher values selected for use on this project. Refer to Figure 10.1.

2. Snow Loading

Flat roof snow loads, sloped roof snow loads, snowdrift, and unbalanced snow loads will be accounted for in accordance with ASCE 7.

Exposure	B, Fully Exposed
Ground Snow Load (pg)	43 psf
Importance Factor (Is)	1.10

3. Wind Loading

The ASCE 7 Section on wind loads is used to calculate the design forces. The design base shear is found using the static force procedure with the following factors:

Basic Wind Speed	90 mph
Wind Exposure	B
Importance Factor (Iw)	1.00

4. Seismic Loading
The ASCE 7 Section on earthquake loads is used to calculate the design forces. The design base shear is found using the equivalent lateral force procedure with the following factors:

Short Period Map Value (Ss)	16.2% g
1-Sec Period Map Value (S1)	6.5% g
Site Class (soil factor)	D (assumed, to be verified) 5%
Spectral Response Acceleration (SDS)	17.3% g
5% Spectral Response Acceleration (SD1)	10.4% g
Seismic Design Category	B

Existing Building Renovations
Basic Structural System Load-bearing masonry walls
Seismic Resisting System
Ordinary plain masonry shear walls
Response Modification Factor (R) 1.5

New Construction
Basic Structural System Light-frame (wood)
Seismic Resisting System
Light-frame (wood) bearing walls, Rated for shear resistance
Response Modification Factor (R) 6.5

C. DESIGN CONSIDERATIONS
1. Stability
a) Dead Load = 1.5 x Overturning
b) Dead Load = 1.5 x Sliding
c) Dead Load + Anchorage = 1.5 x Overturning

2. Lateral Deflection
a) Design (amplified) story drift due to seismic loads shall not exceed .007 x story height
b) Design story drift due to wind shall not exceed .002 x story height

3. Floor Deflections
a) The floor live load deflection of steel or wood beams and girders shall not exceed 1/360 of span lengths. Total deflection (dead + live) shall not exceed 1/240 of span lengths.
b) The load deflection of slab on wood or metal deck shall not exceed 1/360 of span length. Total deflection (dead + live) shall not exceed 1/240 of span lengths.
c) Roof deflection under live, snow or wind load shall not exceed 1/240 of the span length or 1/360 if a plaster ceiling is suspended. Total deflection (dead + live) shall not exceed 1/1800 of span lengths (1/240 for plaster).

4. Vibrations
Where human comfort is the criteria for limiting pedestrian induced motion, floor framing vibration due to footfall vibrations will be verified. Where running machinery causes vibrations, the machinery shall be isolated by damping devices.

5. Non-Structural Components
Provisions for the support of non-structural components are as follows:

a) All masonry partitions will require positive attachment to structure.
b) M/E/P systems are to be braced against seismic forces and provided with appropriate joints to allow seismic movements/ settlements.

6. Sustainability
Living Building full certification is assumed to be a goal of this project and, as such, general sustainability goals will be kept in mind during the course of design and construction. On a structural level, improvement in building sustainability can be achieved primarily in the selection of materials and resources as well as in the support of architectural, MEP and Civil sustainability goals for the project. The structural opportunities to contribute to the building's sustainability goals are summarized below:

a) Fly ash and/or ground granulated blast-furnace slag (GGBFS) can be used in the concrete mix to replace a portion of the Portland cement needed: Fly ash is considered a post-consumer recycled material, one of the residues generated in the combustion of coal, generally captured from the chimneys of power generation facilities. GGBFS is a by-product of steel-making. Their use provides an additional benefit in that it reduces the embodied energy of the cement mixture as the production of Portland cement requires very large amounts of energy.
b) Structural steel qualifies as a post-consumer recycled material.
c) Regional materials can be used, specifically concrete that is regionally batched.
d) Reusable forms can be specified instead of plywood in order to decrease construction waste.
e) If areas of concrete construction or paving need to be demolished for the new construction, it could be crushed for use as a sub-base below the foundations, both decreasing construction waste and providing a recycled material.
f) Low-emitting materials can be specified for materials such as low-VOC adhesives and concrete sealants.

V. STRUCTURAL MATERIAL SPECIFICATIONS

A. CONCRETE

1. Foundations
   - a) 28-day Compressive Strength (f'c) — 4,000 psi
   - b) Density (γ) — 150 lb/ft3

2. Reinforcing
   - a) Mild — ASTM A-615 Grade 60
   - b) Wire Mesh — ASTM A-185

3. Structural Steel
   - a) Rolled Shapes — ASTM A992
   - b) Hollow Steel Sections — ASTM A500–Grade B
   - c) Round Pipes — ASTM A53–Grade B
   - d) Miscellaneous Steel Shapes and Plates — ASTM A36
   - e) High-Strength Bolts — ASTM A325, A490
   - f) Welding Electrodes — E70XX

4. Metal Deck
   - a) Formed from steel sheets — ASTM A611 or A653
   - b) Minimum yield strength — 33 ksi
   - c) Hot dip galvanizing — ASTM A653 Grade 90

5. Reinforced Concrete Masonry
   - a) Concrete masonry units (CMU) — ASTM C90, Grade N1, f'm= 1500 psi
   - b) Mortar — ASTM C270, Type N
   - c) Grout — ASTM C476, f'c = 3000 psi
   - d) Joint Reinforcement — Heavy Duty Ladder Type
   - e) Vertical Reinforcement — fy = 60 ksi

6. Wood
   - a) Solid sawn lumber
     - 1) Rafters and Joists — Hem-fir or SPF #2
     - 2) Beams, girders and headers — Hem-fir or SPF #1
     - 3) Studs and plates — Hem-fir or SPF stud grade
   - b) Engineered lumber
     - 1) Rim boards — 1-1/4" Timberstrand LSL by iLevel
     - 2) Microllam beams — LVL (Fb = 2600 psi) by iLevel
     - 3) Glulam beams or trusses — Glulam (Fb = 2600 psi)
     - 4) Laminated wood deck — Lock-deck (Fb = 2300 psi)

Occupancy or Use	Live Loadings	
	Uniform	Concentrated
First Floor Corridors, Lobbies and Stairs	100 psf	1000 lbs
Stairs	100 psf	300 lbs on 4 in^2
Offices	50 psf (1)	2000 lbs
Classrooms	40 psf (1)	1000
Library Reading Rooms	60 psf (1)	1000 lbs
Library Stack Rooms	150 psf	1000 lbs
Second Floor Corridors	80 psf	1000 lbs
Roof	20 psf	300 lbs
Mechanical Rooms	150 psf (2)	
Terraces	100 psf	
Sidewalks and Driveways	250 psf	8000 lbs on 20 in^2
Surcharge for Landscape Features	100 psf	

(1) Partition LL of 15 psf also applied to new construction.

(2) Used in absence of actual weight of mechanical equipment.

Figure 10.1
UNIFORMLY DISTRIBUTED LIVE LOADING

MECHANICAL/ ELECTRICAL/ PLUMBING NARRATIVE

RENOVATION PROGRAM WITH ELECTRICAL

HVAC

A. Air Handling Systems:

- The original air handling units and exhaust fans for the Exhibition Building were replaced as part of the 2015 renovation. The new air handling units are electric heat pump type with manufacturer's packaged controls. The air handling units and exhaust fans appear to be in good working condition and shall be reused as part of this renovation. The distribution ductwork shall be modified to coordinate with the proposed architectural partition layout and usage. New air devices will be provided.
- The original air handling units and exhaust fans for the Museum Gift Shop were replaced as part of the 2015 renovation. The new air handling units are electric heat pump type with manufacturer's packaged controls. The air handling units and exhaust fans appear to be in good working condition and shall be reused as part of this renovation. The distribution ductwork shall be modified to coordinate with the proposed architectural partition layout and usage. New air devices will be provided.
- Since the existing Museum Gift Shop Pavilion is to be enclosed, a new single zone split system heat pump unit with manufacturer's packaged controls shall be provided. Low pressure ductwork and air devices shall also be provided.
- New split systems with manufacturer's packaged controls shall be provided for the Maintenance Barns and Collection Storage. Electric duct-mounted humidifiers shall be provided for all collections spaces.
- All new and existing air systems shall be fully balanced/ rebalanced.

PLUMBING

Domestic Water System

A. Domestic water (hot/cold/hot water recirculation) branch piping shall be modified to coordinate with the proposed architectural partition layout and usage. Where appropriate, additional ball valves for shut-off provisions shall be provided.

B. All domestic water piping shall be insulated.

C. All potable water piping, valves, etc. shall comply with NSF-61/372 for drinking water quality and low lead requirements.

Plumbing Fixtures

A. New plumbing fixtures will be provided for all new/ renovated men and women toilet rooms. These fixtures will include wall mounted flush valve operated water closets and urinals and counter or wall mounted lavatories. The fixtures will be water saving type and will be barrier free where required in accordance with the Americans with Disabilities Act (ADA) and ANSI A 117.1. Sensor operated flush valves for urinals, water closets and sensor operated faucets will be provided inside the toilet rooms to limit the amount of water consumed during use.

Sanitary Waste and Vent System

A. Sanitary waste and vent piping shall be modified to coordinate with the proposed architectural partition layout and usage from all plumbing fixtures.

FIRE PROTECTION

Fire Protection System

A. The existing wet pipe sprinkler systems shall be extended/modified, as required to coordinate with the proposed architectural partition layout. A double interlocked preaction system shall be provided for all collections spaces. The fire protection system will be designed in accordance with all applicable state and city codes, and NFPA standards.

ELECTRICAL

Normal Power Distribution

A. The existing normal power distribution system will be extended/modified, as required, to coordinate with the proposed architectural partition layout.

B. Panelboards for new lighting, receptacles and HVAC loads will be provided as necessary.

C. Motors will be controlled using variable frequency controllers or full voltage, non-reversing combination motor starters with NEMA rated starters and motor circuit protector disconnects. Where variable frequency controllers (VFC) are provided, they will include a bypass feature to allow the equipment to operate if the VFC internal devices fail. Motors rated ½ horsepower or greater will be 460V, three phase, and motors rated less than ½ horsepower will be 115 V, single phase. Heavy duty, non-fused safety switches will be provided for motors not within line of sight of the motor starters. Power factor correction capacitors will be provided for motors rated 20 horsepower or greater to maintain a minimum power factor of 0.95. Power factor correction will not be required for motors controlled by variable

frequency controllers.
D. Branch circuits will typically have dedicated neutrals for each phase conductor. For lighting and convenience receptacle branch circuits, home runs may contain up to three single phase circuits with dedicated neutrals for each phase conductor, along with shared equipment grounding conductors. Single phase branch circuits with dedicated neutral conductors and dedicated equipment grounding conductors will be provided for receptacle branch circuits for computers, telecommunications equipment, and AV equipment.

- Conduits will be installed concealed in walls, and above ceilings throughout the building except in mechanical and electrical rooms. Rigid metal conduit will be used for feeder circuits, exposed exterior work, and locations where susceptible to damage. Flexible metal conduit will be used in short lengths for connections to vibrating equipment, motors, and lighting fixtures. For all other general purposes, electrical metallic tubing (EMT) with steel setscrew type connectors and couplings will be used. Minimum conduit size will be ¾-inch.
- Schedule 40 PVC conduit will be used for direct buried applications, such as exterior lighting branch circuits. Exterior branch circuit conduits will be minimum 1¼-inch diameter.
- All 600V conductors will be copper with Type THHN, THHW, or XHHW insulation. Minimum wire size will be #12 AWG. All feeders and branch circuits will be provided with a separate green insulated equipment grounding conductor.
- In accordance with ASHRAE /IESNA Standard 90.1 and NEC 210-19, conductors will be sized to allow for a maximum system voltage drop of 5%. Feeder conductors will be designed for a maximum voltage drop of 2%. Branch circuit conductors will be designed for a maximum voltage drop of 3%.

Lighting
The existing lighting system will be extended/modified, as required, to coordinate with the proposed architectural partition layout.

In renovated areas, new lighting illumination levels will generally be as recommended by the Illumination Engineering Society of North America (IESNA) Lighting Handbook, with specific consideration given to visual acuity, aesthetics, and sustainability, according to the needs of each space. Lighting power densities for both interior and exterior spaces will be designed in accordance with the ASHRAE/IES Standard 90.1. Lighting system selections will be coordinated with architectural, structural, and mechanical designs.

A. In renovated areas, new interior lighting fixtures will be energy efficient light emitting diode (LED) lighting fixtures.
B. The existing lighting control system will be extended to control the new lighting in the renovated areas.
C. Emergency battery pack lighting fixtures will be provided in the renovated areas for emergency egress lighting. Emergency lighting will accomplish an average light level of one footcandle over the paths of egress within the building, with a minimum of 0.1 footcandle required per code.

Communication Systems
The existing building's infrastructure and wire management system for telecommunications cabling and equipment will be extended to cover the renovated parts of the building. Wall outlets will be installed in four-inch square boxes with empty conduits and pull strings extended to above accessible ceilings. Cable trays and J-hooks will be provided above the corridor ceilings for cable distribution from telecom rooms.

Lightning Protection
The building's lightning protection system will be extended to cover any parts of the building footprint being added. Structural steel columns will be connected to the ground ring and will be used as the down conductors to interconnect the rooftop lightning air terminals with the below grade ground ring. The ground ring system will connect to the building electrical service entrance ground. All mechanical equipment and flues on roof will be bonded to the grounding system. The system will comply with the latest edition of UL 96A and Standard for the Installation of Lighting Protection System, NFPA 780.

Fire Alarm System
The existing fire alarm system will be extended/modified, as required, to coordinate with the proposed architectural partition layout.

PROPOSED NEW BUILDING PROGRAM WITH ELECTRICAL

HVAC

Refrigeration

A. Chilled water will be utilized for cooling and dehumidification within the building. A dedicated stand-alone chilled water plant will be provided within the building. The chilled water system is proposed to operate during occupied hours whenever outdoor air dry-bulb temperature is above 50ºF.

B. Preliminary load estimates of the design day cooling requirements for the building yield a peak hourly load of approximately 100 tons for the new building.

C. Five (5) nominal 360 MBh output water-to-water heat pumps are required for the new building to satisfy the chilled water loads. Each heat pump can serve either the heating water system or the chilled water system. A dedicated primary hot/chilled water pump will serve each heat pump.

D. The chilled water system will utilize 45ºF chilled water supply temperature, 55ºF chilled water return temperature, a buffer tank, and variable flow secondary pumping. Chilled water pumps will be provided with variable frequency controllers (VFCs) - one per pump, to reduce energy consumption during part load operation.

E. The source side of the heat pumps will be connected to a ground source water system. Heat will be extracted or rejected (depending on mode of operation) via the heat pumps from the heating hot water or chilled water systems to the ground source water system.

F. The ground source water systems will be closed loop, and each will consist of a well field, two (2) variable flow primary well field pumps (one standby), and two (2) variable flow secondary building pumps (one standby).

- Two-way open/close control valves will be provided at each heat pump. Ground source water pumps will be provided with variable frequency controllers (VFCs) - one per pump, to reduce energy consumption during part load operation.
- A soil conductivity test will be performed early in the Design Development design process to determine the required quantity, depth, and spacing of the wells. At this time, 500-feet deep wells spaced 20 feet on center with a capacity of 2-1/2 tons each are assumed. Each well will contain 1,000 feet of 1-1/4 inch piping and be filled with high conductivity (bentonite) grout. A total of 40 wells are proposed.

G. A vertically mounted centrifugal separator is proposed to remove particles that accumulate in the ground source water system.

H. The heat pumps and associated pumps will be located in the lower level mechanical room.

I. A shot feeder and chemical water treatment will be provided for the closed chilled water and ground source piping systems.

Heat Generation

A. The facility will be provided with a hot water heating system to serve all of its heating requirements. The heating plant will be located in the lower level mechanical room and is proposed to operate year around as required to meet heating loads and maintain building humidity control (reheat).

B. Five (5) nominal 360 MBh output water-to-water heat pumps are required for the new building to satisfy the heating loads. Each heat pump can serve either the heating water system or the chilled water system. Refer to Refrigeration section above for further description of the heat pumps. A dedicated primary hot/chilled water pump will serve each heat pump.

C. The heating water system will utilize 110ºF heating water supply temperature, 100ºF heating water return temperature, a buffer tank, and variable flow secondary pumping. Two (2) base-mounted, secondary pumps (one standby) will circulate heating water to air handling unit coils, terminal unit reheat coils, and miscellaneous terminal heating equipment including unit heaters. The secondary heating water pumps will be provided with variable frequency controllers (VFCs - one per pump) to reduce energy consumption during part load operation. The heat pumps and associated circulation pumps will be located in a lower level mechanical room.

D. A tertiary loop with water temperature reset will be provided in the Visitor Center to serve radiant floors. Two (2) base-mounted, tertiary pumps (one standby) will circulate heating water to radiant floors.

E. A shot feeder and chemical water treatment will be provided for the hot water heating systems.

F. Humidification: Clean steam humidification systems will be provided for each air handling unit. Humidifier manifolds will be provided within the casing of each air handling unit and will be piped to an electric powered humidifier with capacity to maintain a general RH level of 35% throughout the building. Gallery spaces will be maintained at 40% RH.

Air Handling Unit (AHU) and Air Distribution System

A. Air Handling Systems:

- Three (3) main air-handling systems, totaling approximately 30,000 CFM, are proposed to condition the occupied areas of the new building. Separate air handling units shall be provided for Temporary Exhibits, Crossing Gallery, and Miscellaneous Spaces.
- All air handling units (AHUs) will be a factory-fabricated type and will be located on a flat roof of the building.
- Each air handling system will be controlled to operate

in its occupied or unoccupied mode, and all units will utilize airside economizer controls. Carbon dioxide sensors will be utilized in high occupancy spaces to vary the minimum amounts of ventilation air introduced in response to space occupancy. Generally, in the unoccupied mode, air-handling systems will be off, and will cycle on with no outside air introduced to maintain temperature and relative humidity limits within the spaces. The Temporary Exhibits unit will operate continuously to maintain space temperature and relative humidity.

• Unit components will include a centrifugal supply air fan, a centrifugal return/relief air fan, chilled water cooling coil, humidifier, hot water preheat coil, 30% efficient pre-filters, 85% efficient final filters, air blender, and miscellaneous control and isolation dampers.

• Medium pressure supply ductwork with a duct-mounted sound attenuator will extend from the AHU and will be routed to air terminal units, which serve each control zone. Medium pressure ductwork will be 4" w.g. construction per SMACNA Standards. Terminal units will be variable air volume pressure independent type with electric reheat coils. Air will be supplied to each zone via its dedicated air terminal unit through low pressure (2" w.g.) ductwork and ceiling diffusers. All supply ductwork will be insulated with fiberglass duct wrap in concealed locations and rigid board insulation in exposed locations. A canvas jacket will be provided for all exposed locations. In addition to insulation, internal sound lining will be provided in medium pressure ductwork for approximately 35 feet upstream and downstream of the air handling unit and for approximately 10 feet downstream of terminal units. Air will be returned from all spaces via air devices and a ceiling return air plenum. Low pressure return air ductwork between the open ended ducts and air handling unit will include a sound attenuator in the ductwork upstream of the return air fan. Return duct will be insulated similar to that described above for supply ductwork.

• Supply fan volume control will be accomplished through the use of variable frequency controllers (VFCs), which will modulate fan speed (and flow) to maintain a constant duct static pressure. The return fan, also equipped with a VFC, will be programmed to track supply fan speed with an appropriate flow offset to maintain positive building pressurization.

B. Exhaust Systems:

• Toilet rooms and janitor's closets will be exhausted by exhaust fans located on the roof. Each space will be exhausted via ceiling grilles and uninsulated low pressure ductwork connected to the fan. The fan will be interlocked to operate with the air handling unit(s) supplying the zone in which the exhausted room resides.

C. Equipment Room HVAC Systems:

• Mechanical Equipment Rooms (MER's) will be mechanically ventilated via an in-line supply and exhaust fans. Supply air will be filtered via disposable filters in side access filter housings. The ventilation systems will be thermostatically controlled.

• The main mechanical equipment room housing the water-to-water heat pumps will have a refrigerant monitor, alarm and exhaust system complying with ASHRAE Standard 15. The exhaust system will have two-speed fan and will also serve as equipment room ventilation system, controlled from space thermostat.

• All equipment spaces will be provided with hot water unit heaters to maintain winter temperatures at minimum 55ºF.

HVAC Instrumentation and Controls

A computer based direct digital control (DDC) energy management and automatic temperature control system will be provided to control and monitor the proposed HVAC systems and equipment.

PLUMBING

Domestic Water System

A. Domestic potable and fire protection water for the new building will be provided from one main water service pipe that will be extended into the lower level mechanical equipment room. Once inside the MER, the water service will be separated to serve both the fire and domestic water systems.

B. A double check valve type backflow preventer and water meter (with strainer) will be provided in the domestic water service to serve the plumbing fixtures. Make-up water (non-potable) for mechanical equipment, ice makers, coffee makers, etc. will be provided through separate, dedicated backflow preventers where required.

C. All domestic water branch piping will be provided with ball valves for shut-off provisions.

D. All domestic water piping in all facilities will be insulated.

E. All potable water piping, valves, etc. shall comply with NSF-61/372 for drinking water quality and low lead requirements

F. The building will be provided with an electric storage water heater to serve the hot water requirements.

G. Storage electric water heaters will store hot water at 140°F to prevent legionnaires disease from developing inside the water heater. A thermostatic mixing valve will be provided at each storage water heater to limit hot water to the public toilet rooms to 110°F as required by

ASHRAE 90.1 and/or to serve other plumbing fixtures requiring domestic hot water at a lower temperature. An expansion tank will also be provided at each storage water heater to comply with the plumbing code. Hot water recirculation pumps and piping will be provided with the storage water heaters if the hot water distribution main exceeds 100 develop feet in length from the water heater per the plumbing code.

H. The site water pressure is inadequate for domestic water and non-potable HVAC make-up water needs. A new duplex booster pump package with variable speed drives and a hydro-pneumatic tank will be provided.

Plumbing Fixtures

A. Plumbing fixtures for the new building will be provided in the men and women toilet rooms. These fixtures will include wall mounted flush valve operated water closets and urinals and counter or wall mounted lavatories. The fixtures will be water saving type and will be barrier free where required in accordance with the Americans with Disabilities Act (ADA) and ANSI A 117.1. Sensor operated flush valves for urinals, water closets and sensor operated faucets will be provided inside the toilet rooms to limit the amount of water consumed during use.

B. Miscellaneous plumbing fixtures will include electric water coolers, mop receptors, and counter mounted stainless steel sinks. Frost proof wall hydrants will be located on the exterior walls at grade. Hose bibs with integral vacuum breakers will be provided within all mechanical equipment rooms.

C. Floor drains will be provided within all toilet rooms and all mechanical equipment. The floor drains will be furnished with deep seal traps with trap priming connections and/or trap seal devices.

Sanitary Waste and Vent System

A. Sanitary waste from all plumbing fixtures, floor drains, equipment drains, etc., will be collected within each building and/or facility via stacks or mains as required. All sanitary stacks and/or mains will be extended out of the buildings and/or facilities below the lowest level floor slab via gravity, and piped out of the building.

B. Sanitary vents will be extended up through the buildings and/or facilities and will discharge out through the roof where convenient.

Storm Water System

A. Rain water will be collected from building roofs either by roof drains and/or gutters. The roof drains and/or gutters will be piped down through the buildings via interior rain leaders and/or exterior downspouts as required.

B. The rain leaders will be extended out of the buildings below the lowest level floor slab via gravity and connected to the on-site storm water system. The exterior downspouts will be piped below grade to the on-site storm water system.

C. Buildings with flat roofs that with have parapet walls will be provided with primary and secondary (overflow) roof drains as required by the plumbing code.

D. Primary roof drains will be piped below grade via interior vertical rain leaders. All secondary (overflow) roof drains will be piped out of the building above grade separate from the primary roof drain system as required by the plumbing code. In lieu of a separate, dedicated secondary roof drain system, scuppers could be provided in parapet walls to allow for overflow water to discharge off the roof.

E. Elevator pits will be furnished with sump(s) and pump(s). The elevator pump(s) will be equipped with a stainless steel probe sensor with a control system that will automatically shut the pump(s) off in the event that oil is sensed in the effluent being pumped out of the sump. If the pump(s) shut-off due to oil in the effluent an alarm will be sent to the building's automation system via the pump(s) control panel. The pump(s) discharge will be hard-piped to the storm water system.

F. Since a portion of the lower floor level will be below grade, foundation drains will be provided for that portion of the building. The foundation drainage system will be piped below grade via gravity to the on-site storm water system.

FIRE PROTECTION

Fire Protection System

A. A new 6-inch water service will connect to the existing campus water service and enter the building in the lower level mechanical equipment room (MER). The water service will be split into fire suppression and domestic water systems, each protected with dedicated back flow devices.

B. The building will be protected by a hydraulically designed automatic wet pipe sprinkler system connected to the water service via a double check valve backflow preventer. The fire protection system will be designed in accordance with all applicable state and city codes, and NFPA standards.

ELECTRICAL

Service Entrance Equipment

A. A new pad mounted medium voltage transformer will be provided by Dominion Energy electrical utility company.

B. Secondary electrical service to the facility will be underground and will feed a 480Y/277V distribution switchboard.

Normal Power Distribution

A. The main distribution switchboard (800A, 480Y/277V, 3PH, 4W) will be located in the main electrical room. The switchboard will contain an electronic trip main circuit breaker and group mounted molded case feeder circuit breakers. The feeder circuit breakers will serve step-down transformers, mechanical equipment panelboards, and branch panelboards to serve building plug and lighting loads. The switchboard will be equipped with copper bus bars, Surge-Protective Device (SPD), and a digital power meter.

B. Power will be distributed at 480Y/277V from the switchboard, with new dry type transformers provided to supply 208Y/120V loads. Dedicated electrical closets will be provided as required. Each electrical closet will contain a 480Y/277V panelboard for lighting and HVAC loads, and 208Y/120V panelboards for receptacle branch circuits. Panelboard and transformer ratings will be chosen to include a minimum of 25 percent spare capacity, and all panelboards will include a minimum of 25 percent spare circuit breakers or bussed space. All panelboards will be provided with copper bus bars, equipment ground busses, and bolt-on molded case circuit breakers.

C. Power will be provided on the exterior of the building for outdoor activities.

D. Motors will be controlled using variable frequency controllers or full voltage, non-reversing combination motor starters with NEMA rated starters and motor circuit protector disconnects. Where variable frequency controllers (VFC) are provided, they will include a bypass feature to allow the equipment to operate if the VFC internal devices fail. Motors rated ½ horsepower or greater will be 460V, three phase, and motors rated less than ½ horsepower will be 115 V, single phase. Heavy duty, non-fused safety switches will be provided for motors not within line of sight of the motor starters. Power factor correction will not be required for motors controlled by variable frequency controllers.

E. Branch circuits will typically have dedicated neutrals for each phase conductor. For lighting and convenience receptacle branch circuits, home runs may contain up to three single phase circuits with dedicated neutrals for each phase conductor, along with shared equipment grounding conductors. Single phase branch circuits with dedicated neutral conductors and dedicated equipment grounding conductors will be provided for receptacle branch circuits for computers, telecommunications equipment, and AV equipment.

- Conduits will be installed concealed in walls, and above ceilings throughout the building except in mechanical and electrical rooms. Rigid metal conduit will be used for feeder circuits, exposed exterior work, and locations where susceptible to damage. Flexible metal conduit will be used in short lengths for connections to vibrating equipment, motors, and lighting fixtures. For all other general purposes, electrical metallic tubing (EMT) with steel compression type connectors and couplings will be used. Minimum conduit size will be ¾-inch.
- Schedule 40 PVC conduit will be used for direct buried applications, such as exterior lighting branch circuits. Exterior branch circuit conduits will be minimum 1¼-inch diameter.
- All 600V insulated conductors will be copper with Type THHN or THHW insulation. Minimum wire size will be #12 AWG. All feeders and branch circuits will be provided with a separate green insulated equipment grounding conductor.
- In accordance with ASHRAE /IESNA Standard 90.1 and NEC 210-19, conductors will be sized to allow for a maximum system voltage drop of 5%. Feeder conductors will be designed for a maximum voltage drop of 2%. Branch circuit conductors will be designed for a maximum voltage drop of 3%.

Emergency Power

A. A central battery inverter system will be provided to provide power to Life Safety loads to include egress lighting and exit signs.

Lighting

Lighting illumination levels will generally be as recommended by the Illumination Engineering Society of North America (IESNA) Lighting Handbook, with specific consideration given to visual acuity, aesthetics, and sustainability, according to the needs of each space. Lighting power densities for both interior and exterior spaces will be designed in accordance with the ASHRAE/IES Standard 90.1. Lighting system selections will be coordinated with architectural, structural, and mechanical designs.

A. Complete lighting systems for both normal and emergency operations will be provided. Typically, new interior lighting fixtures throughout the facility will be energy efficient light emitting diode (LED) lighting fixtures.

B. A building-wide lighting control system will be provided to allow for on/off and dimming control. Lighting level sensing and dimming control will be provided to optimize lighting levels in coordination with a daylight harvesting system.

C. Other than public spaces and exhibits, occupancy sensors will be used throughout the building to automatically turn lighting off when rooms are unoccupied. Occupancy sensors will be ceiling mounted or wall mounted. Where ceiling mounted sensors are used, a wall mounted switch will allow for occupant override.

D. Lighting in stairwells will be switched for 50% off adjustment for when stairs are unoccupied. A minimum

level of light will remain on in stairwells for security purposes.

E. Lighting in space with an abundance of natural light will be controlled to turn "off" via photocell operation in response to available natural light. Fixture mounted photocells and/or ceiling mounted photocells will be used.

F. Lighting will be provided throughout the facility for illumination of paths of egress, including stairs, corridors, and public areas. Exit signs shall be the light-emitting diode (LED) type, and served by emergency power. No unitary battery equipment will be used. Egress lighting and exit signs will be unswitched for continuous "on" operation. Emergency lighting will accomplish an average light level of one footcandle over the paths of egress within the building, with a minimum of 0.1 footcandle required per code.

G. Exterior lighting for walkways, entrances, and other select areas will be provided. Exterior lighting will be a combination of building mounted, pole mounted, and bollard fixtures. Exterior lighting design will address personnel security and aesthetics, while at the same time maintain sensitivity to light pollution of surrounding areas. Exterior lighting will typically be LED-type. Control of exterior lighting fixtures will be through the lighting control system, and turned on/off via a combination of photocell and astronomic time clock.

Communication Systems

A. A building infrastructure and wire management system for telecommunications cabling and equipment will be provided in accordance with EIA/TIA-569, Commercial Building Standard for Telecommunications Pathways and Spaces, and EIA/TIA-607, Commercial Building Grounding and Bonding Requirements for Telecommunications.

B. Communications equipment closets will be stacked where possible. Four 4-inch conduit sleeves will be provided between stacked rooms. All sleeves through walls and floors will be firestopped. Unused conduits and sleeves will be capped.

C. A complete infrastructure for cabling system will be provided for voice and data, including riser and horizontal cabling, terminations, and testing.

D. Dedicated receptacles will be provided to serve telecommunications racks and rack-mounted UPS units, size and NEMA configuration will be as dictated by rack-mounted equipment needs.

E. Wall outlets will be installed in four-inch square boxes with empty conduits and pull strings extended to above accessible ceilings. Cable trays and J-hooks will be provided above the corridor ceilings for cable distribution from telecom rooms.

Lightning Protection

A complete UL Master Label lightning protection system will be specified for the building, including rooftop air terminals, down conductors, and grounding electrodes. A ground ring consisting of ground rods and buried interconnecting bare ground wire encircling the building will be specified. Structural steel columns will be connected to the ground ring and will be used as the down conductors to interconnect the rooftop lightning air terminals with the below grade ground ring. The ground ring system will connect to the building electrical service entrance ground. All mechanical equipment and flues on roof will be bonded to the grounding

Fire Alarm System

A. The fire alarm system will be digital addressable, designed in accordance with NFPA 72 (the National Fire Alarm and Signaling Code), NFPA 101 (the Life Safety Code), the ADA Accessibility Guidelines for Buildings and Facilities.

B. Initiation of the building alarm will be by manual fire alarm boxes (single-action type), smoke detectors (photoelectric type), heat detectors (combination type), and water flow switches in the automatic sprinkler system.

C. Occupant notification will be by audible and visual alarms (horns and strobe lights). Automatic sprinkler system control valves and smoke detectors in HVAC ductwork will be supervised by the fire alarm system.

D. In order to comply with the ASME A17.1 (Safety Code for Elevators and Escalators) requirement to automatically disconnect the main line power supply to an elevator machine prior to the application of water from the automatic sprinkler system, a flow switch will be provided to initiate a shunt trip of the feeder circuit disconnect switch for the elevator. Smoke detectors will be provided in each elevator lobby, in the machine rooms, and at the top of the shafts to initiate elevator recall.

E. The fire alarm control panel will be located in the main electrical equipment room on the lower level.

F. A remote annunciator panel will be located at the main fireman's entrance to the buildling.

G. Testing of fire alarm system will follow NFPA 72 procedures and supervised by a NICET Level III technician.

Photovoltaic System

The economic feasibility of a large scale photovoltaic system to supplement the energy consumption of the building will be investigated. The size and location of the system is to be determined

Figure 10.2
COSTUMED INTERPRETER AT 1700s IRISH FARM

11

APPENDICES

Kick-off & Visioning Meeting	May 1 - 2, 2018
Meeting Minutes	
Presentation	
Sketches	
Constraints & Opportunities Meeting	May 21 - 22, 2018
Meeting Minutes	
Presentation	
Site Analysis	
Program Data Sheets	
Sketches	
Alternative Concepts Meeting	June 12 - 13, 2018
Meeting Minutes	
Presentation	
Sketches	
Preferred Concept Meeting	July 16, 2018
Meeting Minutes	
Presentation	
Refined Concept Meeting	August 7, 2018
Meeting Minutes	
Presentation	
Staff Questionnaire	

MEMORANDUM

From: ALYSON STEELE, AIA
KATHRYN SLATTERY, AIA
RYAN MCENROE, AIA, ASLA

QUINN EVANS ARCHITECTS

To: PROJECT TEAM

RE: FRONTIER CULTURE MUSEUM CROSSING GALLERY PRE-PLANNING
STAUNTON, VA
QEA PROJECT # 41803470
PROJECT CODE: 239-18136-000

Subject: Pre-Planning Report Cost Summary

Based upon the draft pre-planning report dated 07 August 2018, the following cost estimate has been developed. The detailed cost estimate provided by R.W. Brown and Associates has been provided for reference.

Cost Summary:

Scope of Work	**Cost**
Proposed Crossing Gallery Building	$8.3M
Proposed Site Improvements	$2.35M
Removal/Relocation of Facilities	$4.2M
Site Entry Improvements	$2.85M
OH&P/Design Contingency	$11.3M
Sub-Total	**$29M**
Exhibit Design & Implementation ($500/sf)	$4M
Total	**$33M**

1. Proposed Crossing Gallery Building
    a. Building program included within the pre-planning report is included within this line item. Program includes visitor services, exhibit and educational space, administrative, and support space. The exhibit design and implementation and exterior pavilion area excluded from this line item.
2. Proposed Site Improvements
    a. A number of minor site improvements accompany and support the overall design of the proposed Crossing Gallery Building. These include adjustments to the visitor path around the site, service access drive, grading, tree removal and planting, and the exterior pavilion with a green roof.
3. Removal/Relocation of Facilities
    a. Building alterations are included within the existing Welcome Center complex. The existing ticketing/visitor center and restrooms will be renovated into proposed educational space. The existing museum shop footprint will be enclosed with a new roof, walls, and foundation to accommodate a renovated educational space. No proposed work is associated with the Administrative Building. New purpose built facilities are provided for maintenance and collection storage.

4. Site Entry Improvements
    a. Primary parking lot and arrival approach
        i. The existing parking lot location is proposed to be re-designed, encouraging a new approach by the visitors. The cost associated includes the proposed parking lot, bioretention areas, drop-off and arrival, and associated landscaping.
    b. Overflow parking
        i. The overflow parking lot and associated raingardens are located on the American Frontier Culture Foundation (AFCF) property and thus has been identified as a separate line item for cost considerations.
        ii. The AFCF board can estimate $1.85M (including contractor mark-ups) for the construction cost of the overflow parking area.
5. OH&P/Deign Contingency
    a. Items within this task include general contractor project requirements, overhead and profit, bond, a 20% design contingency, and escalation with construction taking place between mid-2020 through 2021.
6. Exhibit Design & Implementation
    a. The fees associated with the exhibit design and implementation are based upon an 8,000 s.f. Crossing Gallery Exhibit and include design fees.

END OF MEMORANDUM

Predesign Cost Estimate

Frontier Culture Museum of Virginia
Staunton, Virginia

Prepared for:
Quinn Evans Architects
2121 Ward Place, NW, 4th Floor
Washington, D.C. 20036
202-298-6700

August 6, 2018

Prepared by:
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Architect: Quinn Evans Architects	RWB Job # 18-21-A3
Estimated by: R.W. Brown & Associates	8/6/18

NOTES

1 Unit costs include subcontractors' overheads and profits.

2 Unit prices, provided by suppliers, subcontractors, and past experience, reflect standard construction methods and materials. Sales tax and labor burden are included in the unit prices of each item. Labor prices are based on wage scale conditions but do not reflect overtime. Total estimate considers a competitive bidding process and responsive bids from at least 3 qualified bidders.

3 This estimate is based on criteria stated May 2018 and updated August 2018.

4 The total cost is based on a construction activities to occur between mid-2020 through 2021. Escaltion has been added at the rate of 3.5% p.a.

5 Exclusions:

Architectural and Engineering Fees
Furnishings or equipment not itemized in the estimate

Predesign Cost Estimate

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BUILDING & SITE DEVELOPMENT

Item	Quantity	Unit	Unit Price	Total Cost	Group Total
ENTRY SITE IMPROVEMENTS					
ARRIVAL APPROACH & VISTOR/STAFF PARKING					
VEHICULAR/PEDSTRIAN PAVEMENTS	15,600	SF	11.00	171,600	
BITUMINOUS PAVEMENT	25,500	SY	52.00	1,326,000	
CONCRETE CURBS, ETC	4,020	LF	21.00	84,420	
STORMWATER MANAGEMENT	2,500	SF	20.00	50,000	
LANDSCAPING/PLANTINGS	1	LS	75,000.00	75,000	
SITE SIGNAGE/WAYFINDING	1	LS	20,000.00	20,000	
					1,727,020
OVERFLOW & STAFF PARKING					
BITUMINOUS PAVEMENT	17,000	SY	58.00	986,000	
CONCRETE CURBS, ETC	2,680	LF	21.00	56,280	
RAIN GARDEN	1	LS	70,000.00	70,000	
LANDSCAPING/PLANTINGS	1	LS	10,000.00	10,000	
					1,122,280
VISTOR/GALLERY BUILDING					
NEW VISTOR/GALLERY BUILDING	31,152	SF	265.00	8,255,280	
					8,255,280
SITE IMPROVEMENTS					
EARTHWORK & GRADING					
SURFACE DEMOLITION	52,000	SY	1.50	78,000	
TREE CLEARING	1.1	AC	9,500.00	10,450	
GRADING/CUT & FILL	50,970	SY	8.00	407,760	
ROCK ALLOWANCE	500	CY	250.00	125,000	
EROSION CONTROL	12	AC	7,500.00	87,000	
					708,210
OTHER SITE WORK					
SITE CIRCULATION - GRAVEL PATHS	5,130	SY	30.00	153,900	
SERVICE/MAINTENANCE PAVINGS	15,400	SY	30.00	462,000	
LANDSCAPING - OTHER	6,500	SY	30.00	195,000	
LAWNS	12,400	SY	14.00	173,600	
SITE WALLS	2,400	SF	35.00	84,000	
STORM DRAINAGE	1	LS	100,000.00	100,000	
SITE UTILITIES	1	LS	20,000.00	20,000	
					1,188,500
EXTERIOR PLAZA					
PAVILION	4,500	SF	70.00	315,000	
GREEN ROOF	4,500	SF	40.00	180,000	
SITE FURNISHINGS, SIGNAGE, ETC	1	LS	20,000.00	20,000	
SITE LIGHTING	1	LS	15,000.00	15,000	
					530,000

Predesign Cost Estimate

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BUILDING & SITE DEVELOPMENT (CONTINUED)

Item	Quantity	Unit	Unit Price	Total Cost	Group Total
BUILDING ALTERATIONS					
ADMINISTRATION BUILDING	TO REMAIN AS IS				
ENCLOSE EXTERIOR SPACES/DEVELOP INT	1,000	SF	260.00	260,000	
RENOVATE RESTROOMS	1,000	SF	300.00	300,000	
MUSEUM SHOP ALTERATIONS	1,000	SF	250.00	250,000	
EDUCATION SPACE ALTERATIONS	5,600	SF	250.00	1,400,000	
					2,210,000
REMOVAL/RELOCATION OF FACILITIES					
REMOVE DAIRY BARNS	660,000	CF	0.50	330,000	
REMOVE PAVILION	5,000	SF	10.00	50,000	
GRADING & RESTORATION	2,800	SF	25.00	70,000	
MAINT BLDG - OFFICES	1,000	SF	200.00	200,000	
MAINT BLDG - WORKSHOPS	5,000	SF	180.00	900,000	
MAINT BLDG - STORAGE (UNCOND)	1,500	SF	110.00	165,000	
MAINT BLDG - CURATORIAL STORAGE	2,000	SF	140.00	280,000	
					1,995,000
SUBTOTAL					17,736,290
GENERAL REQUIREMENTS @	10%				1,773,629
SUBTOTAL					19,509,919
GENERAL CONTRACTOR'S OH&P @	10%				1,950,992
SUBTOTAL					21,460,911
BOND @	1.5%				321,914
SUBTOTAL					21,782,825
DESIGN CONTINGENCY @	20%				4,356,565
SUBTOTAL					26,139,389
ESCALATION @	10.88%				2,843,966
TOTAL CONSTRUCTION COST					28,983,355
				SAY:	**28,984,000**